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**UTILITY PATENT APPLICATION TRANSMITTAL
(Small Entity)**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
15265.2Total Pages in this Submission
4**TO THE ASSISTANT COMMISSIONER FOR PATENTS**

**Box Patent Application
Washington, D.C. 20231**

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for **an invention entitled:**

MULTIMEDIA CONTENT NAVIGATION AND PLAYBACK

and invented by:

Matthew T. Jarman

JC714 U.S.P.T.O.
09/694873

10/23/00

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:

Continuation Divisional Continuation-in-part (CIP) of prior application No.: _____

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Enclosed are:

Application Elements

1. Filing fee as calculated and transmitted as described below

2. Specification having 61 pages and including the following:
 - a. Descriptive Title of the Invention
 - b. Cross References to Related Applications (*if applicable*)
 - c. Statement Regarding Federally-sponsored Research/Development (*if applicable*)
 - d. Reference to Microfiche Appendix (*if applicable*)
 - e. Background of the Invention
 - f. Brief Summary of the Invention
 - g. Brief Description of the Drawings (*if drawings filed*)
 - h. Detailed Description
 - i. Claim(s) as Classified Below
 - j. Abstract of the Disclosure

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4

Application Elements (Continued)

3. Drawing(s) (*when necessary as prescribed by 35 USC 113*)
a. Formal b. Informal Number of Sheets 11
4. Oath or Declaration
 - a. Newly executed (*original or copy*) Unexecuted
 - b. Copy from a prior application (37 CFR 1.63(d)) (*for continuation/divisional application only*)
 - c. With Power of Attorney Without Power of Attorney
 - d. **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. Incorporation By Reference (*usable if Box 4b is checked*)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. Computer Program in Microfiche
7. Genetic Sequence Submission (*if applicable, all must be included*)
 - a. Paper Copy
 - b. Computer Readable Copy
 - c. Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. Assignment Papers (*cover sheet & documents*)
9. 37 CFR 3.73(b) Statement (*when there is an assignee*)
10. English Translation Document (*if applicable*)
11. Information Disclosure Statement/PTO-1449 Copies of IDS Citations
12. Preliminary Amendment
13. Acknowledgment postcard
14. Certificate of Mailing
 First Class Express Mail (*Specify Label No.*): EL 624 147 452 US

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Accompanying Application Parts (Continued)

15. Certified Copy of Priority Document(s) (*if foreign priority is claimed*)
16. Small Entity Statement(s) - Specify Number of Statements Submitted: 1
17. Additional Enclosures (*please identify below*):

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

18. Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	54	- 20 =	34	x \$9.00	\$306.00
Indep. Claims	7	- 3 =	4	x \$40.00	\$160.00
Multiple Dependent Claims (check if applicable)	<input type="checkbox"/>				
					BASIC FEE \$355.00
OTHER FEE (specify purpose)					
					TOTAL FILING FEE \$821.00

- A check in the amount of **\$821.00** to cover the filing fee is enclosed.
- The Commissioner is hereby authorized to charge and credit Deposit Account No. **23-3178** as described below. A duplicate copy of this sheet is enclosed.
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- Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: October 23, 2000


Eric M. Kamerath
Signature

Eric M. Kamerath
Registration No. 46,081



022913

cc:

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CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)

Applicant(s): Matthew T. Jarman

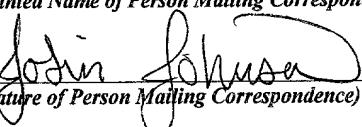
Docket No.

15265.2

Serial No.
not yet assignedFiling Date
October 23, 2000Examiner
not yet assignedGroup Art Unit
not yet assignedInvention: **MULTIMEDIA CONTENT NAVIGATION AND PLAYBACK**

I hereby certify that this Patent Application (and other related documents) **
(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under
37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on
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JoLin Johnson*(Typed or Printed Name of Person Mailing Correspondence)**(Signature of Person Mailing Correspondence)*EL 624 147 452 US*("Express Mail" Mailing Label Number)*

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** Also transmitted:

Transmittal Letter (4 pgs, in triplicate)
Patent Application (61 pgs)
Formal Drawings (11 sheets)
Declaration, Power of Attorney, and Petition (2 pgs)
Declaration Claiming Small Entity Status for an Independent Inventor
(2 pgs)
Certificate of Express Mail Label No.: EL 624 147 452 US
Check No. 118223 in the amount of \$821.00
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DECLARATION CLAIMING SMALL ENTITY STATUS
FOR AN INDEPENDENT INVENTOR

I, Matthew Jarman, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. § 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office under Section 41(a) and (b) of Title 35, United States Code, with regard to the invention entitled MULTIMEDIA CONTENT NAVIGATION AND PLAYBACK, as described in the patent application filed concurrently herewith.

I further declare that I have not assigned, granted, conveyed, or licensed and am under no obligation under contract or law to assign, grant, convey, or license any right, title, or interest in the invention to any person, firm, or organization.

I acknowledge the duty to file, in the above-mentioned application or any patent issued in respect thereof, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of (1) the issue fee or (2) any maintenance fee due after the date on which status as a small entity is no longer appropriate.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful, false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this declaration is directed.

DRAFT - DO NOT FILE

Signed at Salt Lake City, Utah, this 23 day of October, 2000.


Matthew Jarman
3830 South 3100 East
Salt Lake City, UT 84109

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PATENT APPLICATION

Docket No. 15265.2

UNITED STATES PATENT APPLICATION

of

Matthew T. Jarman

for

MULTIMEDIA CONTENT NAVIGATION AND PLAYBACK

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BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates to filtering multimedia content. More specifically, the present invention relates to methods, systems, and computer program products for automatically identifying and filtering portions of multimedia content during the decoding process.

2. The Prior State of the Art

Often, movies and other multimedia content contain scenes or language that are unsuitable for viewers of some ages. To help consumers determine whether a particular movie is appropriate for an audience of a given age, the Motion Picture Association of America (“MPAA”) has developed the now familiar NC-17/R/PG-13/PG/G rating system. Other organizations have developed similar rating systems for other types of multimedia content, such as television programming, computer software, video games, and music.

Both the quantity and context of potentially objectionable material are significant factors in assigning multimedia content a rating. However, a relatively small amount of mature-focused subject matter may be sufficient to remove multimedia content from a rating category recommended for younger children. For example, in a motion picture setting, a single scene of particularly explicit violence, sexuality, or language may require an “R” rating for what would otherwise be a “PG” or “PG-13” movie. As a result, even if an “R” rated motion picture has a general public appeal, individuals trying to avoid “R” rated content, and teenagers restricted by the “R” rating, may choose not to view a motion picture that they would otherwise desire to view if it were not for the inclusion of the explicit scene.

Many consumers may prefer an alternate version of the multimedia content, such as a version that has been modified to make the content more suitable for all ages. To provide

1 modified versions of multimedia works, the prior art has focused on manipulating the
2 multimedia source. The details of how multimedia content is modified depends largely on
3 the type of access the source media supports. For linear access media, such as videotape or
4 audiotape, undesired content is edited from the tape and the remaining ends are spliced back
5 together. The process is repeated for each portion of undesired content the multimedia
6 source contains. Due to the need for specialized tools and expertise, it is impractical for
7 individual consumers to perform this type of editing. While third parties could perform this
8 editing to modify content on a consumer's behalf, the process is highly inefficient because it
9 requires physically handling and repeating the editing for each individual tape.

10 Modifying direct access media, such as DVD, also has focused on modifying the
11 multimedia source. Unlike linear media, direct access media allows for accessing any
12 arbitrary portion of the multimedia content in roughly the same amount of time as any other
13 arbitrary portion of the multimedia content. Direct access media allows for the creation and
14 distribution of multiple versions of multimedia content, including versions that may be
15 suitable to most ages, and storing the versions on a single medium. The decoding process
16 creates various continuous multimedia streams by identifying, selecting, retrieving and
17 transmitting content segments from a number of available segments stored on the content
18 source.

19 To help in explaining the prior art for creating multiple versions of a multimedia
20 work on a single source, a high-level description of the basic components found in a system
21 for presenting multimedia content may be useful. Typically, such systems include a
22 multimedia source, a decoder, and an output device. The decoder is a translator between the
23 format used to store or transmit the multimedia content and the format used for intermediate
24 processing and ultimately presenting the multimedia content at the output device. For

1 example, multimedia content may be encrypted to prevent piracy and compressed to
2 conserve storage space or bandwidth. Prior to presentation, the multimedia content must be
3 decrypted and/or uncompressed, operations usually performed by the decoder.

4 The prior art teaches creation and distribution of multiple versions of a direct access
5 multimedia work on a single storage medium by breaking the multimedia content into
6 various segments and including alternate interchangeable segments where appropriate. Each
7 individually accessible segment is rated and labeled based on the content it contains,
8 considering such factors as subject matter, context, and explicitness. One or more indexes of
9 the segments are created for presenting each of the multiple versions of the multimedia
10 content. For example, one index may reference segments that would be considered a "PG"
11 version of the multimedia whereas another index may reference segments that would be
12 considered an "R" version of the content. Alternatively, the segments themselves or a single
13 index may include a rating that is compared to a rating selected by a user.

14 There are a variety of benefits to the prior art's indexing of interchangeable segments
15 to provide for multiple versions of a multimedia work on a single storage medium. Use of
16 storage space can be optimized because segments common to the multiple versions need
17 only be stored once. Consumers may be given the option of setting their own level of
18 tolerance for specific subject matter and the different multimedia versions may contain
19 alternate segments with varying levels of explicitness. The inclusion of segment indexing on
20 the content source also enables the seamless playback of selected segments (i.e., without
21 gaps and pauses) when used in conjunction with a buffer. Seamless playback is achieved by
22 providing the segment index on the content source, thus governing the selection and
23 ordering of the interchangeable segments prior to the data entering the buffer.

24

1 The use of a buffer compensates for latency that may be experienced in reading from
2 different physical areas of direct access media. While read mechanisms are moved from one
3 disc location to another, no reading of the requested content from the direct access media
4 occurs. This is a problem because, as a general rule, the playback rate for multimedia
5 content exceeds the access rate by a fairly significant margin. For example, a playback rate
6 of 30 frames per second is common for multimedia content. Therefore, a random access
7 must take less than 1/30th of a second (approximately 33 milliseconds) or the random access
8 will result in a pause during playback while the reading mechanism moves to the next start
9 point. A typical 16x DVD drive for a personal computer, however, has an average access
10 rate of approximately 95 milliseconds, nearly three times the 33 milliseconds allowed for
11 seamless playback. Moreover, according to a standard of the National Television Standards
12 Committee (“NTSC”), only 5 to 6 milliseconds are allowed between painting the last pixel
13 of one frame and painting the first pixel of the next frame. Those of skill in the art will
14 recognize that the above calculations are exemplary of the time constraints involved in
15 reading multimedia content from direct access media for output to a PC or television, even
16 though no time is allotted to decoding the multimedia content after it has been read, time
17 that would need to be added to the access time for more precise latency calculations.

18 Once access occurs, DVD drives are capable of reading multimedia content from a
19 DVD at a rate that exceeds the playback rate. To address access latency, the DVD
20 specification teaches reading multimedia content into a track buffer. The track buffer size
21 and amount of multimedia content that must be read into the track buffer depend on several
22 factors, including the factors described above, such as access time, decoding time, playback
23 rate, etc. When stored on a DVD, a segment index, as taught in the prior art, with
24 corresponding navigation commands, identifies and orders the content segments to be read

1 into the track buffer, enabling seamless playback of multiple version of the multimedia
2 content. However, segment indexes that are external to the content source are unable to
3 completely control the navigation commands within the initial segment
4 identification/selection/retrieval process since external indexes can interact with position
5 codes only available at the end of the decoding process. As a result, external segment
6 indexes may be unable to use the DVD track buffer in addressing access latency as taught in
7 the prior art.

8 As an alternative to buffering, segments from separate versions of multimedia
9 content may be interlaced. This allows for essentially sequential reading of the media, with
10 unwanted segments being read and discarded or skipped. The skips, however, represent
11 relatively small movements of the read mechanism. Generally, small movements involve a
12 much shorter access time than large movements and therefore introduce only minimal
13 latency.

14 Nevertheless, the prior art for including multiple versions of a multimedia work on a
15 single direct access media suffers from several practical limitations that prevent it from
16 wide-spread use. One significant problem is that content producers must be willing to create
17 and broadly distribute multiple versions of the multimedia work and accommodate any
18 additional production efforts in organizing and labeling the content segments, including
19 interchangeable segments, for use with the segment indexes or maps. The indexes, in
20 combination with the corresponding segments, define a work and are stored directly on the
21 source media at the time the media is produced. In short, while the prior art offers a tool for
22 authoring multiple versions of a multimedia work, that tool is not useful in and of itself to
23 consumers.

24

1 A further problem in the prior art is that existing encoding technologies must be
2 licensed in order to integrate segment indexes on a direct access storage medium and
3 decoding technologies must be licensed to create a decoder that uses the segment indexes on
4 a multimedia work to seamlessly playback multiple versions stored on the direct access
5 medium. In the case of DVD, the Motion Pictures Entertainment Group (“MPEG”) controls
6 the compression technology for encoding and decoding multimedia files. Furthermore,
7 because producers of multimedia content generally want to prevent unauthorized copies of
8 their multimedia work, they also employ copy protection technologies. The most common
9 copy protection technologies for DVD media are controlled by the DVD Copy Control
10 Association (“DVD CCA”), which controls the licensing of their Content Scramble System
11 technology (“CSS”). Decoder developers license the relevant MPEG and CSS technology
12 under fairly strict agreements that dictate how the technology may be used. In short, the time
13 and cost associated with licensing existing compression and copy protection technologies or
14 developing proprietary compression and copy protection technologies may be significant
15 costs, prohibitive to the wide-spread use of the prior art’s segment indexing for providing
16 multiple versions of a multimedia work on a single direct access storage medium.

17 Additionally, the teachings of the prior art do not provide a solution for filtering
18 direct access multimedia content that has already been duplicated and distributed without
19 regard to presenting the content in a manner that is more suitable for most ages. At the time
20 of filing this patent application, over 5000 multimedia titles have been released on DVD
21 without using the multiple version technology of the prior art to provide customers the
22 ability to view and hear alternate versions of the content in a manner that is more suitable for
23 most ages.

24

1 The prior art also has taught that audio portions of multimedia content may be
2 identified and filtered during the decoding process by examining the closed caption
3 information for the audio stream and muting the volume during segments of the stream that
4 contain words matching with a predetermined set of words that are considered unsuitable for
5 most ages. This art is limited in its application since it cannot identify and filter video
6 segments and since it can only function with audio streams that contain closed captioning
7 information. Furthermore, filtering audio content based on closed captioning information is
8 imprecise due to poor synchronization between closed captioning information and the
9 corresponding audio content.

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SUMMARY OF THE INVENTION

2 These and other problems with the prior art are overcome by the present invention,
3 which is directed toward automatically identifying and filtering portions of multimedia
4 content during the decoding process. As taught in the prior state of the art, the technology
5 for presenting original multimedia content that is suitable for most ages has been
6 concentrated on altering the multimedia at its source. Unlike the prior art's control of the
7 input or source side of a decoder, the present invention permits filtering multimedia content
8 at the output side of a decoder. As a result, the present invention may be practiced without
9 necessarily imposing any particular requirements on the source of the multimedia content.

The present invention includes the creation of navigation objects to define portions of the multimedia content that should be filtered. Each navigation object contains a start position, a stop position, and a filtering action to be performed on the portion of the multimedia content that is defined by the start position and stop position. The navigation objects are placed in an object store. There is no particular limitation on the format of the navigation objects and the object store. For example, the object store may be a file, such as a database and the navigation objects may be records within the database.

17 Navigator software reads navigation objects from the object store and monitors the
18 decoder for the current position code of the multimedia as the multimedia content is being
19 decoded. For DVD multimedia, the position code may be a time code that identifies portions
20 of the multimedia content by hours, minutes, seconds, and frame number. The position code
21 is compared against the start and stop positions defined in each navigation object. When
22 playback reaches a portion of the multimedia defined by a particular navigation object, the
23 navigator activates the editing action assigned to that navigation object.

1 For example, one type of filtering action is a skip. When the navigator determines
2 that the time code for the multimedia content currently being decoded has reached the start
3 position of a navigation object with a skip filtering action, the navigator instructs the
4 decoder to discontinue decoding at the current multimedia position and to resume decoding
5 at the stop position of the navigation object. By discontinuing the decoding process at the
6 start position of the navigation object and resuming the decoding process at the stop position
7 of the navigation object, the portion of the multimedia content defined by the start and stop
8 positions of the multimedia content is never decoded and as a result is never transferred to a
9 multimedia output device, such as a video display. In some cases, the navigator may not
10 begin accessing the stop position to resume the decoding process until after determining that
11 the start position for discontinuing decoding has been accessed, preventing the Navigator
12 from using a read buffer to compensate for the access time required in moving the read
13 mechanism from the start position to the stop position where decoding will resume.

14 Mute is another type of filtering action. When the navigator determines that the time
15 code for the multimedia content currently being decoded has reached the start position of a
16 navigation object with a mute filtering action, the navigator suppresses the audio decoding.
17 Suppressing audio decoding may be accomplished by setting the volume of the multimedia
18 content to be inaudible. Muting continues until the navigator determines that the time code
19 for the multimedia content then being decoded reaches the stop position defined in the
20 navigation object. Once the stop position has been reached, the volume is returned the level
21 in effect prior to the navigator activating the mute filtering action. Unlike the skip action, the
22 muted portion of the multimedia content is decoded and may be transferred to an output
23 device such as speaker, but with the volume set to be inaudible or with the audio decoding

24

1 suppressed in some other way, the muted portion is effectively filtered from the multimedia
2 content.

3 A further type of filtering action is a reframe. In cases where the visual information
4 presented to the viewer only contains unsuitable material in a certain physical area of a
5 scene, the multimedia content can be enlarged if needed and then positioned in the viewing
6 frame in a manner that effectively crops the objectionable information from view. The sizing
7 and framing can be adjusted during the reframe action to continually crop the objectionable
8 material from view. When the navigator determines that the position code for the
9 multimedia content currently being decoded has reached the end position of a reframe
10 navigation object, the navigator instructs the current multimedia to resume to the original
11 framing. For example, if the multimedia includes a head to toe shot of a person with a
12 bloody leg wound, the content can be resized and reframed to show only a head to waist
13 shot.

14 Depending on the multimedia content, some editing actions may produce more
15 noticeable discontinuities, irregularities, or artifacts than others. To reduce a user's
16 perception of potential artifacts, incremental editing actions or editing actions with an
17 incremental component provide for gradual transitions before and/or after an editing action.
18 For example, the display of video content may fade from normal to blank prior to a skip
19 editing action and, after the editing action, from blank back to normal. Similarly, muting
20 actions may fade audio volume in and out to insure smooth transitions for editing actions.
21 As used in this application, editing actions should be interpreted broadly to encompass all
22 types of actions that may be useful in editing multimedia content, including incremental
23 editing actions that are either separate from or combined with other editing actions.

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1 Depending on the multimedia content, some filtering actions may produce more
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7 actions may fade audio volume in and out to insure smooth transitions for filtering actions.
8 As used in this application, filtering actions should be interpreted broadly to encompass all
9 types of actions that may be useful in filtering multimedia content, including incremental
10 filtering actions that are either separate from or combined with other filtering actions.

11 The present invention may be practiced in a variety of computerized systems,
12 including servers, personal computers, television systems, and audio systems. A typical
13 system for a personal computer includes a DVD drive with decoding hardware and/or
14 software, navigator software with navigation objects for a particular DVD title, a computer
15 display for video output, and speakers for audio output. For television systems with a
16 conventional DVD player and television set, the navigator software and navigation objects
17 may be stored in a remote control device that communicates with the DVD player and
18 television set over a traditional infrared channel. Alternatively, the television system may
19 include a DVD player that includes the navigator software and navigation object store.

20 Additional features and advantages of the invention will be set forth in the
21 description which follows, and in part will be obvious from the description, or may be
22 learned by the practice of the invention. The features and advantages of the invention may
23 be realized and obtained by means of the instruments and combinations particularly pointed
24 out in the appended claims. These and other features of the present invention will become

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1 more fully apparent from the following description and appended claims, or may be learned
2 by the practice of the invention as set forth hereinafter.

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BRIEF DESCRIPTION OF THE DRAWINGS

In order to describe the manner in which the above-recited and other advantages and features of the invention can be obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

9 Figure 1 illustrates an exemplary system that provides a suitable operating
10 environment for the present invention;

11 Figure 2 is high-level block diagram showing the basic components of a system
12 embodying the present invention:

13 Figures 3A, 3B, and 3C, are block diagrams of three systems that provide greater
14 detail for the basic components shown in Figure 2:

15 Figures 4A, 5A, and 7, are flowcharts depicting exemplary methods for editing
16 multimedia content according to the present invention:

17 Figures 4B and 5B illustrate navigation objects in relation to mocked-up position
18 codes for multimedia content; and

Figure 6 is a flowchart portraying a method used in customizing the editing of multimedia content.

DETAILED DESCRIPTION OF THE INVENTION

The present invention extends to methods, systems, and computer program products for automatically identifying and filtering portions of multimedia content during the decoding process. The embodiments of the present invention may comprise a special purpose or general purpose computer including various computer hardware, a television system, an audio system, and/or combinations of the foregoing. These embodiments are discussed in greater detail below. However, in all cases, the described embodiments should be viewed as exemplary of the present invention rather than as limiting its scope.

9 Embodiments within the scope of the present invention also include
10 computer-readable media for carrying or having computer-executable instructions or data
11 structures stored thereon. Such computer-readable media may be any available media that
12 can be accessed by a general purpose or special purpose computer. By way of example, and
13 not limitation, such computer-readable media can comprise RAM, ROM, EEPROM,
14 CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage
15 devices, or any other medium which can be used to carry or store desired program code
16 means in the form of computer-executable instructions or data structures and which can be
17 accessed by a general purpose or special purpose computer. When information is transferred
18 or provided over a network or another communications link or connection (either hardwired,
19 wireless, or a combination of hardwired or wireless) to a computer, the computer properly
20 views the connection as a computer-readable medium. Thus, any such a connection is
21 properly termed a computer-readable medium. Combinations of the above should also be
22 included within the scope of computer-readable media. Computer-executable instructions
23 comprise, for example, instructions and data which cause a general purpose computer,

1 special purpose computer, or special purpose processing device to perform a certain function
2 or group of functions.

3 Figure 1 and the following discussion are intended to provide a brief, general
4 description of a suitable computing environment in which the invention may be
5 implemented. Although not required, the invention will be described in the general context
6 of computer-executable instructions, such as program modules, being executed by
7 computers in network environments. Generally, program modules include routines,
8 programs, objects, components, data structures, etc. that perform particular tasks or
9 implement particular abstract data types. Computer-executable instructions, associated data
10 structures, and program modules represent examples of the program code means for
11 executing steps of the methods disclosed herein. The particular sequence of such executable
12 instructions or associated data structures represent examples of corresponding acts for
13 implementing the functions described in such steps. Furthermore, program code means
14 being executed by a processing unit provides one example of a processor means.

15 Those skilled in the art will appreciate that the invention may be practiced in
16 network computing environments with many types of computer system configurations,
17 including personal computers, hand-held devices, multi-processor systems,
18 microprocessor-based or programmable consumer electronics, network PCs, minicomputers,
19 mainframe computers, and the like. The invention may also be practiced in distributed
20 computing environments where tasks are performed by local and remote processing devices
21 that are linked (either by hardwired links, wireless links, or by a combination of hardwired
22 or wireless links) through a communications network. In a distributed computing
23 environment, program modules may be located in both local and remote memory storage
24 devices.

With reference to Figure 1, an exemplary system for implementing the invention includes a general purpose computing device in the form of a conventional computer 20, including a processing unit 21, a system memory 22, and a system bus 23 that couples various system components including the system memory 22 to the processing unit 21. The system bus 23 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory includes read only memory (ROM) 24 and random access memory (RAM) 25. A basic input/output system (BIOS) 26, containing the basic routines that help transfer information between elements within the computer 20, such as during start-up, may be stored in ROM 24.

The computer 20 may also include a magnetic hard disk drive 27 for reading from and writing to a magnetic hard disk 39, a magnetic disk drive 28 for reading from or writing to a removable magnetic disk 29, and an optical disk drive 30 for reading from or writing to removable optical disk 31 such as a CD-ROM or other optical media. The magnetic hard disk drive 27, magnetic disk drive 28, and optical disk drive 30 are connected to the system bus 23 by a hard disk drive interface 32, a magnetic disk drive-interface 33, and an optical drive interface 34, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer-executable instructions, data structures, program modules and other data for the computer 20. Although the exemplary environment described herein employs a magnetic hard disk 39, a removable magnetic disk 29 and a removable optical disk 31, other types of computer readable media for storing data can be used, including magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, RAMs, ROMs, and the like.

1 Program code means comprising one or more program modules may be stored on the
2 hard disk 39, magnetic disk 29, optical disk 31, ROM 24 or RAM 25, including an operating
3 system 35, one or more application programs 36, other program modules 37, and program
4 data 38. A user may enter commands and information into the computer 20 through
5 keyboard 40, pointing device 42, or other input devices (not shown), such as a microphone,
6 joy stick, game pad, satellite dish, scanner, or the like. These and other input devices are
7 often connected to the processing unit 21 through a serial port interface 46 coupled to
8 system bus 23. Alternatively, the input devices may be connected by other interfaces, such
9 as a parallel port, a game port or a universal serial bus (USB). A monitor 47 or another
10 display device is also connected to system bus 23 via an interface, such as video adapter 48.
11 In addition to the monitor, personal computers typically include other peripheral output
12 devices (not shown), such as speakers and printers.

13 The computer 20 may operate in a networked environment using logical connections
14 to one or more remote computers, such as remote computers 49a and 49b. Remote
15 computers 49a and 49b may each be another personal computer, a server, a router, a network
16 PC, a peer device or other common network node, and typically include many or all of the
17 elements described above relative to the computer 20, although only memory storage
18 devices 50a and 50b and their associated application programs 36a and 36b have been
19 illustrated in Figure 1. The logical connections depicted in Figure 1 include a local area
20 network (LAN) 51 and a wide area network (WAN) 52 that are presented here by way of
21 example and not limitation. Such networking environments are commonplace in office-wide
22 or enterprise-wide computer networks, intranets and the Internet.

23 When used in a LAN networking environment, the computer 20 is connected to the
24 local network 51 through a network interface or adapter 53. When used in a WAN

1 networking environment, the computer 20 may include a modem 54, a wireless link, or other
2 means for establishing communications over the wide area network 52, such as the Internet.
3 The modem 54, which may be internal or external, is connected to the system bus 23 via the
4 serial port interface 46. In a networked environment, program modules depicted relative to
5 the computer 20, or portions thereof, may be stored in the remote memory storage device. It
6 will be appreciated that the network connections shown are exemplary and other means of
7 establishing communications over wide area network 52 may be used.

8 Turning next to Figure 2, a high-level block diagram identifying the basic
9 components of a system for filtering multimedia content are shown. The basic components
10 include content source 230, decoders 250, navigator 210, and output device 270. Content
11 source 230 provides multimedia to decoder 250 for decoding, navigator 210 controls
12 decoder 250 so that filtered content does not reach output device 270, and output device 270
13 plays the multimedia content it receives. As used in this application, the term "multimedia"
14 should be interpreted broadly to include audio content, video content, or both.

15 The present invention does not require a particular content source 230. Any data
16 source that is capable of providing multimedia content, such as a DVD, a CD, a memory, a
17 hard disk, a removable disk, a tape cartridge, and virtually all other types of magnetic or
18 optical media may operate as content source 230. Those of skill in the art will recognize that
19 the above media includes read-only, read/write, and write-once varieties, whether stored in
20 an analog or digital format. All necessary hardware and software for accessing these media
21 types are also part of content source 230. Content source 230 as described above provides an
22 example of multimedia source means.

23 Multimedia source 230 generally provides encoded content. Encoding represents a
24 difference in the formats that are typically used for storing or transmitting multimedia

1 content and the formats used for intermediate processing of the multimedia content.
2 Decoders 250 translate between the storage and intermediate formats. For example, stored
3 MPEG content is both compressed and encrypted. Prior to being played at an output device,
4 the stored MPEG content is decrypted and uncompressed by decoders 250. Decoders 250
5 may comprise hardware, software, or some combination of hardware and software. Due to
6 the large amount of data involved in playing multimedia content, decoders 250 frequently
7 have some mechanism for transferring data directly to output device 270. Decoders 250 are
8 an exemplary embodiment of decoder means.

9 Output device 270 provides an example of output means for playing multimedia
10 content and should be interpreted to include any device that is capable of playing
11 multimedia content so that the content may be perceived. For a computer system, like the
12 one described with reference to Figure 1, output device 270 may include a video card, a
13 video display, an audio card, and speakers. Alternatively, output device 270 may be a
14 television or audio system. Television systems and audio systems cover a wide range of
15 equipment. A simple audio system may comprise little more than an amplifier and speakers.
16 Likewise, a simple television system may be a conventional television that includes one or
17 more speakers and a television screen. More sophisticated television and audio systems may
18 include audio and video receivers that perform sophisticated processing of audio and video
19 content to improve sound and picture quality.

20 Output device 270 may comprise combinations of computer, television, and audio
21 systems. For example, home theaters represent a combination audio and television systems.
22 These systems typically include multiple content sources, such as components for videotape,
23 audiotape, DVD, CD, cable and satellite connections, etc. Audio and/or television systems
24 also may be combined with computer systems. Therefore, output device 270 should be

1 construed as including the foregoing audio, television, and computer systems operating
2 either individually, or in some combination. Furthermore, when used in this application,
3 computer system (whether for a consumer or operating as a server), television system, and
4 audio system may identify a system's capabilities rather than its primary or ordinary use.
5 These capabilities are not necessarily exclusive of one another. For example, a television
6 playing music through its speakers is properly considered an audio system because it is
7 capable of operating as an audio system. That the television ordinarily operates as part of a
8 television system does not preclude it from operating as an audio system. As a result, terms
9 like consumer system, server system, television system, and audio system, should be given
10 their broadest possible interpretation to include any system capable of operating in the
11 identified capacity.

12 Navigator 210 is software and/or hardware that control the decoders 250 by
13 determining if the content being decoded needs to be filtered. Navigator 210 is one example
14 of multimedia navigation means. It should be emphasized that content source 230, decoders
15 250, output device 270, and navigator 210 have been drawn separately only to aid in their
16 description. Some embodiments may combine content source 230, decoders 250, and
17 navigator 210 into a single set-top box for use with a television and/or audio system.
18 Similarly, a computer system may combine portions of decoder 250 with output device 270
19 and portions of decoder 250 with content source 230. Many other embodiments are possible,
20 and therefore, the present invention imposes no requirement that these four components
21 must exist separately from each other. As such, the corresponding multimedia source means,
22 decoder means, output means, and multimedia navigation means also need not exist
23 separately from each other and may be combined together as is appropriate for a given
24 embodiment of the present invention. It is also possible for content source 230, decoders

1 250, output device 270, and/or navigator 210 to be located remotely from each other and
2 linked together with a communication link.

3 As noted previously, Figures 3A, 3B, and 3C, are block diagrams of three exemplary
4 systems that provide greater detail for the basic components shown in Figure 2. However,
5 the present invention is not limited to any particular physical organization of the components
6 shown in Figure 2. Those of skill in the art will recognize that these basic components are
7 subject to a wide-range of embodiments, including a single physical device or several
8 physical devices. Therefore, Figure 2 and all other figures should be viewed as exemplary of
9 embodiments according to the present invention, rather than as restrictions on the present
10 invention's scope.

11 Similar to Figure 2, Figure 3A includes navigator 310a, content source 330a, audio
12 and video decoders 350a, and output device 370a, all located at consumer system 380a.
13 Content source 330a includes DVD 332a and DVD drive 334a. The bi-directional arrow
14 between content source 330a and audio and video decoders 350a indicates that content
15 source 330 provides multimedia content to audio and video decoders 350a and that audio
16 and video decoders 350a send commands to content source 330a when performing filtering
17 operations.

18 Navigator 310a monitors decoders 350a by continuously updating the time code of
19 the multimedia content being decoded. (Time codes are an example of positions used in
20 identifying portions of multimedia content. In the case of time codes, positioning is based on
21 an elapsed playing time from the start of the content. For other applications, positions may
22 relate to physical quantities, such as the length of tape moving from one spool to another in
23 a videotape or audiotape. The present invention does not necessarily require any particular
24 type of positioning for identifying portions of multimedia content.) In one embodiment, the

1 time code updates occur every 1/10th of a second, but the present invention does not require
2 any particular update interval. (The description of Figures 4B and 5B provides some insight
3 regarding factors that should be considered in selecting an appropriate update interval.)

4 Communication between Navigator 310a and audio and video decoders 350a occurs
5 through a vendor independent interface 352a. The vendor independent interface 352a allows
6 navigator 310a to use the same commands for a number of different content sources.
7 Microsoft's ® DirectX ® is a set of application programming interfaces that provides a
8 vendor independent interface for content sources 330a in computer systems running a
9 variety of Microsoft operating systems. Audio and video decoders 350a receive commands
10 through vendor independent interface 352a and issue the proper commands for the specific
11 content source 330a.

12 Audio and video decoders 350a provide audio content and video content to output
13 device 370a. Output device 370a includes graphics adapter 374a, video display 372a, audio
14 adaptor 376a, and speakers 378a. Video display 372a may be any device capable of
15 displaying video content, regardless of format, including a computer display device, a
16 television screen, etc.

17 Usually, graphics adaptors and audio adaptors provide some decoding technology so
18 that the amount of data moving between content source 330a and output device 370a is
19 minimized. Graphics adaptors and audio adaptors also provide additional processing for
20 translating multimedia content from the intermediate processing format to a format more
21 suitable for display and audio playback. For example, many graphics adaptors offer video
22 acceleration technology to enhance display speeds by offloading processing tasks from other
23 system components. In the case of graphics and audio adaptors, the actual transition between
24 decoders 350a and output device 370a may be a somewhat fuzzy. To the extent graphics

1 adaptor 374a and audio adapter 376a perform decoding, portions of those adaptors may be
2 properly construed as part of decoders 350a.

3 Navigator 310a includes navigation software 312a and object store 316a.
4 Bi-directional arrow 314a indicates the flow of data between navigation software 312a and
5 object store 316a. Object store 316a contains a plurality of navigation objects 320a. Within
6 object store 316a, navigation objects may be stored as individual files that are specific to
7 particular multimedia content, they may be stored in one or more common databases, or
8 some other data management system may be used. The present invention does not impose
9 any limitation on how navigation objects are stored in object store 316a.

10 Each navigation object 320a defines when (start 321a and stop 323a) an filtering
11 action (325a) should occur for a particular system (329a) and provides a description (327a)
12 of why the navigation object was created. Start and stop positions (321a and 323a) are stored
13 as time codes, in hours:minutes:seconds:frame format; actions may be either skip or mute
14 (325a); the description is a text field (327a); and configuration is an identifier (329a) used to
15 determine if navigation object 320a applies to a particular consumer system 380b. The
16 values indicate that the start position 321a is 00:30:10:15; stop position 323a is 00:30:15:00;
17 the filtering action 325a is skip; the description 327a is “scene of bloodshed” and the
18 configuration 329a is 2.1. More detail regarding navigation objects, such as navigation
19 object 320a, will be provided with reference to Figures 4B and 5B.

20 As navigator 310a monitors audio and video decoders 350a for the time code of the
21 multimedia content currently being decoded, the time code is compared to the navigation
22 objects in object store 316a. When the position code falls within the start and stop positions
23 defined by a navigation object, navigator 310a activates the filtering action assigned to the
24 navigation object. For navigation object 320a, a time code within the approximately

1 four-second range of 00:30:10:15 – 00:30:15:00 result in navigator 310a issuing a command
2 to audio and video decoders 350a to skip to the end of the range so that the multimedia
3 content within the range is not decoded and is not given to output device 370a. The process
4 of filtering multimedia content will be described in more detail with reference to Figures 4A,
5 5A, 6, and 7.

6 As in Figure 3A, Figure 3B includes a content source 330b, audio and video
7 decoders 350b, and output device 370b. In Figure 3B, however, object store 316b is located
8 at server system 390b, and all other components are located at consumer system 380b. As
9 shown by start 321b, stop 323b, action 325b, description 327b, and configuration 329b, the
10 contents of navigation object 320b remain unchanged.

11 Content source 330b, including DVD drive 334b and DVD 332b, have been
12 combined with audio and video decoders 350b, vendor independent interface 352b, and
13 navigation software 312b into a single device. Communication between navigation software
14 312b and object store 316b occurs over communication link 314b. Communication link
15 314b is an example of communication means and should be interpreted to include any
16 communication link for exchanging data between computerized systems. The particular
17 communication protocols for implementing communication link 314b will vary from one
18 embodiment to another. In Figure 3B, at least a portion of communication link 314b may
19 include the Internet.

20 Output device 370b includes a television 372b with video input 374b and an audio
21 receiver 377b with an audio input 376b. Audio receiver 377b is connected to speakers 378b.
22 As noted earlier, the sophistication and complexity of output device 370b depends on the
23 implementation of a particular embodiment. As shown, output device 370b is relatively
24 simple, but a variety of components, such as video and audio receivers, amplifiers,

1 additional speakers, etc., may be added without departing from the present invention.
2 Furthermore, it is not necessary that output device 370b include both video and audio
3 components. If multimedia content includes only audio content, the video components are
4 not needed. Likewise, if the multimedia content includes only video data, the audio
5 components of output device 370b may be eliminated.

6 Moving next to Figure 3C, navigator 310c, content source 330c, audio and video
7 decoders 350c, and output device 370c are all present. Like Figure 3B, Figure 3C includes a
8 server/remote system 390c and a consumer system 380c. For the embodiment shown in
9 Figure 3C, navigator 310c is located at server/remote system 390c and content source 330c,
10 audio and video decoders 350c, and output device 370c are located at the consumer
11 system 380c.

12 Navigator 310c includes server navigation software 312c and object store 316c, with
13 data being exchanged as bi-directional arrow 314c indicates. Start 321c, stop 323c, action
14 325c, description 327c, and configuration 329c, show that the contents of navigation object
15 320c remain unchanged from navigation objects 320b and 320a (Figures 3B and 3A).
16 Content source 330c includes DVD drive 334c and DVD 332c, and output device 370c
17 includes graphics adaptor 374c, video display 372c, audio adapter 376c, and speakers 378c.
18 Because content source 330c and output device 370c are identical to the corresponding
19 elements in Figure 3A, their descriptions will not be repeated here.

20 In contrast to Figure 3A, client navigator software 354c had been added to audio and
21 video decoders 350c and vendor independent interface 352c. Client navigator software 354c
22 supports communication between navigation software 312c and vendor independent
23 interface 352c through communication link 356c. In some embodiments, no client navigator
24 software 354c will be necessary whereas in other embodiments, some type of

1 communication interface supporting communication link 356c may be necessary. For
2 example, suppose consumer system 380c is a personal computer, server/remote system 390c
3 is a server computer, and at least a portion of communication link 356c includes the Internet.
4 Client navigator software 354c may be helpful in establishing communication link 356c and
5 in passing information between consumer system 380c and server/remote system 390c.

6 Now, suppose content source 330c and audio and video decoders 350c are combined
7 as in a conventional DVD player. Server/remote system 390c may be embodied in a remote
8 control unit that controls the operation of the DVD player over an infrared or other
9 communication channel. Neither client navigator software 354c nor vendor independent
10 interface 352c may be needed for this case because server/remote system 390c is capable of
11 direct communication with the DVD player and the DVD player assumes responsibility for
12 controlling audio and video decoders 350c.

13 Several exemplary methods of operation for the present invention will be described
14 with reference to the flowcharts illustrated by Figures 4A, 5A, 6, and 7, in connection with
15 the mocked-up position codes and navigation objects presented in Figures 4B and 5B.
16 Figure 4A shows a sample method for filtering multimedia content according to the present
17 invention. Although Figures 4A, 5A, 6, and 7 show the method as a sequence of events, the
18 present invention is not necessarily limited to any particular ordering. Because the methods
19 may be practiced in both consumer and server systems, parentheses have been used to
20 identify information that is usually specific to a server.

21 Beginning with a consumer system, such as the one shown in Figure 3A, an object
22 store may be part of a larger data storage. For example, a separate object store may exist for
23 multimedia content stored on individual DVD titles. Because many object stores have been
24 created, at block 412 the multimedia content title is retrieved from the content source.

1 Alternatively, a single object store may contain navigation objects corresponding to more
2 than one DVD title. At block 414, with the title identifier, the object store and corresponding
3 navigation objects that are specific to a particular DVD title are selected. (Receive fee,
4 block 416, will be described later, with reference to a server system.) At block 422, the first
5 navigation object for the DVD title identified at 412 is retrieved.

6 Turning briefly to Figure 4B, a navigation object is shown in the context of
7 multimedia content. Content positions 480 identify various positions, labeled P_{4₁}, P_{4₂}, P_{4₃},
8 P_{4₄}, P_{4₅}, P_{4₆}, and P_{4₇}, that are associated with the multimedia content. The navigation
9 object portion 490 of the content begins at start 491 (P_{4₂}) and ends at stop 493 (P_{4₆}).
10 Skip 495 is the filtering action assigned to the navigation object and scene of bloodshed 497
11 is a text description of the navigation object portion 490 of the multimedia content.
12 Configuration 499 identifies the hardware and software configuration of a consumer system
13 to which the navigation object applies. For example, configuration 499 may include the
14 make, model, and software revisions for the consumer's computer, DVD drive, graphics
15 card, sound card, and may further identify the DVD decoder and the consumer computer's
16 motherboard.

17 The motivation behind configuration 499 is that different consumer systems may
18 introduce variations in how navigation objects are processed. As those variations are
19 identified, navigation objects may be customized for a particular consumer system without
20 impacting other consumer systems. The configuration identifier may be generated according
21 to any scheme for tracking versions of objects. In Figure 4B, the configuration identifier
22 includes a major and minor revision, separated by a period.

23 Returning now to Figure 4A, a navigation object as described above has been
24 retrieved at block 422. Decision block 424 determines whether the configuration identifier

1 of the navigation object matches the configuration of the consumer system. Matching does
2 not necessarily require exact equality between the configuration identifier and the consumer
3 system. For example, if major and minor revisions are used, a match may only require
4 equality of the major revision. Alternatively, the configuration identifier of a navigation
5 object may match all consumer configurations. Configuration identifiers potentially may
6 include expressions with wildcard characters for matching one or more characters, numeric
7 operators for determining the matching conditions, and the like. If no match occurs,
8 returning to block 422 retrieves the next navigation object.

9 Retrieving a content identifier (412), selecting navigation objects (414), retrieving a
10 navigation object (422), and determining whether the configuration identifier matches the
11 consumer system configuration (424) have been enclosed within a dashed line to indicate
12 that they are all examples of acts that may occur within a step for providing an object store
13 having navigation objects.

14 With a navigation object identified, the decoders begin decoding the multimedia
15 content (432) received from the DVD. Once decoded, the content is transferred (434) to the
16 output device where it can be played for a consumer. While decoding the multimedia
17 content, the position code is updated continuously (436). The acts of decoding (432),
18 transferring (434), and continuously updating the position code (436) have been enclosed in
19 a dashed line to indicate that they are examples of acts that are included within a step for
20 using a decoder to determine when multimedia content is within a navigation object (430).

21 A step for filtering multimedia content (440) includes the acts of comparing the
22 updated position code to the navigation object identified in block 422 to determine if the
23 updated position code lies within the navigation object and the act of activating an filtering
24 action (444) when appropriate. If the updated position code is not within the navigation

1 object, decoding continues at block 432. But if the updated position code is within the
2 navigation object, the filtering action is activated (444). Following activation of the filtering
3 action, the next navigation object is retrieved at block 422.

4 Using the navigation object illustrated in Figure 4B, the method of Figure 4A will be
5 described in greater detail. The navigation object is retrieved in block 422 and passes the
6 configuration match test of block 424. After the multimedia content is decoded at block 432
7 and transferred to the output device at block 434, the position code is updated at block 436.
8 P₄₁ corresponds to the updated position code. Because P₄₁ is not within the start and stop
9 positions (491 and 493), more multimedia content is decoded (432), transferred to the output
10 device (434), and the position code is updated again (436).

11 The updated position code is now P₄₂. P₄₂ also marks the beginning of the
12 navigation object portion 490 of the multimedia content defined by the start and stop
13 positions (491 and 493) of the navigation object. The video filtering action, skip 495 is
14 activated in block 444. Activating the video filtering action sends a command to the decoder
15 to discontinue decoding immediately and resume decoding at stop position 493. The content
16 shown between P₄₂ and P₄₆ is skipped. Following the skip, the next navigation object is
17 retrieved at block 422 and the acts describe above are repeated.

18 Abruptly discontinuing and resuming the decoding may lead to noticeable artifacts
19 that detract from the experience intended by the multimedia content. To diminish the
20 potential for artifacts, filtering actions may be incrementally activated or separate
21 incremental filtering action may be used. For example, a fade out (e.g., normal to blank
22 display) filtering action may precede a skip filtering action and a fade in (e.g., blank to
23 normal display) filtering action may follow a skip filtering action. Alternatively, the fading
24 out and fading in may be included as part of the skip filtering acting itself, with the start and

1 stop positions being adjusted accordingly. The length of fade out and fade in may be set
2 explicitly or use an appropriately determined default value. Incremental filtering actions
3 need not be limited to a specific amount of change, such as normal to blank display, but
4 rather should be interpreted to include any given change, such as normal to one-half
5 intensity, over some interval. Furthermore, incremental filtering actions may be used to
6 adjust virtually any characteristic of multimedia content.

7 Where multimedia content includes visual information being presented to a viewer, it
8 is possible that unsuitable material may be localized to only a certain physical area of the
9 scene as it is presented. In these cases one or more navigation objects with reframe filtering
10 actions may be appropriate. The entire scene need not be skipped because the viewing frame
11 may be positioned to avoid showing the unsuitable material and the remaining content may
12 be enlarged to provide a full-size display. By continually adjusting the framing and sizing of
13 multimedia content during a scene, the unsuitable material is effectively cropped from view.

14 Each reframe navigation object is capable of performing a number of reframe/resize
15 actions, including the ability to reframe and resize on a frame-by-frame basis. Therefore, the
16 number of reframe navigation objects used in cropping a particular scene depends on a
17 variety of factors, including how the scene changes with time. A single navigation object
18 may be sufficient to filter a relatively static scene, whereas more dynamic scenes will likely
19 require multiple navigation objects. For example, one navigation object may be adequate to
20 reframe a scene showing an essentially static, full-body, view of a person with a severe leg
21 wound to a scene that includes only the person's head and torso. However, for more
22 dynamic scenes, such as a scene where the person with the severe leg wound is involved in a
23 violent struggle or altercation with another person, multiple reframe navigation objects may
24 be required for improved results.

1 Positions P₄₁, P₄₂, P₄₃, P₄₄, P₄₅, P₄₆, and P₄₇ are separated by the update interval.
2 Those of skill in the art will recognize that a shorter update interval will allow for more
3 precise filtering. For example, if start 491 were shortly after position P₄₂, multimedia
4 decoding and output would continue until position P₄₃, showing nearly 1/4 of the
5 multimedia content that was to be filtered. With an update interval occurring ten times each
6 second, only a minimal amount of multimedia content that should be filtered (e.g., less than
7 1/10th of a second) will be displayed at the output device. As has been implied by the
8 description of configuration identifier 499, it is reasonable to expect some variability in
9 consumer systems and the invention should not be interpreted as requiring exact precision in
10 filtering multimedia content. Variations on the order of a few seconds may be tolerated and
11 accounted for by expanding the portion of content defined by a navigation object, although
12 the variations will reduce the quality of filtering as perceived by a consumer because scenes
13 may be terminated prior to being completely displayed.

14 The differences enclosed in parentheses for server operation are relatively minor and
15 those of skill in the art will recognize that a consumer and server may cooperate, each
16 performing a portion of the processing that is needed. Figure 3B provides an exemplary
17 system where processing is shared between a server system and a consumer system.
18 Nevertheless, the following will describe the processing as it would occur at a server system,
19 similar to the one shown in Figure 3C, but with only the output device located at the
20 consumer system.

21 At block 412, the server receives the DVD title identifier so that the proper
22 navigation objects can be selected in block 414. The server receives a fee from the consumer
23 system, in block 416, for allowing the consumer system access to the navigation objects.
24 The fee may be a subscription for a particular time period, a specific number of accesses,

etc. The first navigation object for the DVD title identified at 412 is retrieved in block 422 and checked for a configuration match in block 424. Because the configuration match is checked at the server, the consumer system supplies its configuration information or identifier. As described above, receiving a content identifier (412), selecting navigation objects (414), receiving a fee (416), retrieving a navigation object (422), and determining whether the configuration identifier matches the consumer system configuration (424) have been enclosed within a dashed line to indicate that they are all examples of acts that may occur within a step for the server system providing an object store having navigation objects.

Decoding the multimedia content (432) may occur at either the consumer system or the server system. However, sending decoded multimedia from a server system to a consumer system requires substantial communication bandwidth. At block 434, the multimedia content is transferred to the output device. The server system then queries (436) the client system decoder to update the position code. Alternatively, if the decoding occurred at the server system, the position code may be updated (436) without making a request to the consumer system. The acts of decoding (432), transferring (434), and continuously updating or querying for the position code (436) have been enclosed in a dashed line to indicate that they are examples of acts that are included within a step for the server system using a decoder to determine when multimedia content is within a navigation object (430).

The server system performing a step for filtering multimedia content (440) includes the acts of (i) comparing the updated position code to the navigation object identified in block 422 to determine if the updated position code lies within the navigation object, and (ii) activating or sending an filtering action (444) at the proper time. Decoding continues at block 432 for updated position codes that are not within the navigation object. Otherwise, the filtering action is activated or sent (444) for updated position codes within the navigation

1 object. Activating occurs when the decoder is located at the consumer system, but if the
2 decoder is located at the consumer system, the filtering action must be sent to the consumer
3 system for processing. The next navigation object is retrieved at block 422 following
4 activation of the filtering action, and processing continues as described above. The analysis
5 of Figure 4B will not be repeated for a server system because the server operation is
6 substantially identical to the description provided above for a consumer system.

7 Figure 5A illustrates a sample method for filtering audio content, possibly included
8 with video content, according to the present invention. The steps for providing 510 and
9 using 530, including the acts shown in processing blocks 512, 514, 516, 522, 524, 532, 534,
10 and 536 are virtually identical to the corresponding steps and acts described with reference
11 to Figures 4A. Therefore, the description of Figure 5A begins with a step for filtering (540)
12 multimedia content.

13 Decision block 542 determines if an updated or queried position code (536) is within
14 the navigation object identified in blocks 522 and 524. If so, decision block 552 determines
15 whether or not an filtering action is active. For portions of multimedia content within a
16 navigation object where the filtering action is active or has been sent (in the case of server
17 systems), decoding can continue at block 532. If the filtering action is not active or has not
18 been sent, block 544 activates or sends the filtering action and then continues decoding at
19 block 532.

20 If decision block 542 determines that the updated or queried position code (536) is
21 not within the navigation object, decision block 556 determines whether or not an filtering
22 action is active or has been sent. If no filtering action is active or has been sent, decoding
23 continues at block 532. However, if an filtering action has been activated or sent and the
24 updated position code is no longer within the navigation object, block 546 activates or sends

1 and end action and continues by identifying the next navigation object in blocks 522
2 and 524.

3 In general, some filtering may be accomplished with one action, like the video action
4 of Figure 4B, while others require ongoing actions, like the audio action of Figure 5B. The
5 mocked-up position codes and audio navigation object shown in Figure 5B help explain the
6 differences between single action filtering of multimedia content and continuous or ongoing
7 filtering of multimedia content. Content positions 580 identify various positions, labeled
8 P₅₁, P₅₂, P₅₃, P₅₄, P₅₅, P₅₆, and P₅₇, that are associated with the multimedia content. The
9 navigation object portion 590 of the content begins at start 591 (P₅₂) and ends at stop 593
10 (P₅₆). Mute 595 is the filtering action assigned to the navigation object and “F” word 597 is
11 a text description of the navigation object portion 590 of the multimedia content. Like
12 configuration 499 of Figure 4B, configuration 599 identifies the hardware and software
13 configuration of a consumer system to which the navigation object applies.

14 After the multimedia content is decoded at block 532 and transferred to the output
15 device at block 534, the position code is updated at block 536. P₅₁ corresponds to the
16 updated position code. Because P₅₁ is not within (542) the start position 591 and stop
17 position 593 and no filtering action is active or sent (556), more multimedia content is
18 decoded (532), transferred to the output device (534), and the position code is updated
19 again (536).

20 The updated position code is now P₅₂. P₅₂ also marks the beginning of the
21 navigation object portion 590 of the multimedia content defined by the start and stop
22 positions (591 and 593) of the navigation object, as determined in decision block 542.
23 Because not action is active or sent, decision block 552 continues by activating or
24 sending (544) the filtering action assigned to the navigation object to mute audio content,

1 and once again, content is decoded (532), transferred to the output device (534), and the
2 position code is updated or queried (536).

3 Muting, in its most simple form, involves setting the volume level of the audio
4 content to be inaudible. Therefore, a mute command may be sent to the output device
5 without using the decoders. Alternatively, a mute command sent to the decoder may
6 eliminate or suppress the audio content. Those of skill in the art will recognize that audio
7 content may include one or more channels and that muting may apply to one or more of
8 those channels.

9 Now, the updated or queried position code (536) is P5₃. Decision block 542
10 determines that the updated or queried position code (536) is within the navigation object,
11 but an filtering action is active or has been sent (552), so block 532 decodes content,
12 block 524 transfers content to the output device, and block 536 updates or queries the
13 position code. The audio content continues to be decoded and the muting action continues to
14 be activated.

15 At this point, the updated or queried position code (536) is P5₄. Now decision
16 block 542 determines that the updated or queried position code (536) is no longer within the
17 navigation object, but decision block 556 indicates that the muting action is active or has
18 been sent. Block 546 activates or sends and end action to end the muting of the audio
19 content and the decoding continues at block 532. For DVD content, the result would be that
20 the video content is played at the output device, but the portion of the audio content
21 containing an obscenity, as defined by the navigation object, is filtered out and not played at
22 the output device.

23 Abruptly altering multimedia content may lead to noticeable artifacts that detract
24 from the experience intended by the multimedia content. To diminish the potential for

1 artifacts, filtering actions may be incrementally activated or separate incremental filtering
2 action may be used. For example, a fade out (e.g., normal to no volume) filtering action may
3 precede a mute filtering action and a fade in (e.g., no volume to normal) filtering action may
4 follow a mute filtering action. Alternatively, the fading out and fading in may be included as
5 part of the mute filtering acting itself, with the start and stop positions being adjusted
6 accordingly. The length of fade out and fade in may be set explicitly or use an appropriately
7 determined default value. Incremental filtering actions are not limited to any particular
8 amount of change, such as normal to no volume, but rather should be interpreted to include
9 any change, such as normal to one-half volume, over some interval. Furthermore,
10 incremental filtering actions may adjust virtually any characteristic of multimedia content.

11 Like the method shown in Figure 4A, the method shown in Figure 5A may be
12 practiced at both client systems and server system. However, the methods will not be
13 described in a server system because the distinctions between a consumer system and a
14 server system have been adequately identified in the description of Figures 4A and 4B.

15 Figure 6 is a flowchart illustrating a method used in customizing the filtering of
16 multimedia content. At block 610, a password is received to authorize disabling the
17 navigation objects. A representation of the navigation objects is displayed on or sent to (for
18 server systems) the consumer system in block 620. Next, as shown in block 630, a response
19 is received that identifies any navigation objects to disable and, in block 640, the identified
20 navigation objects are disabled.

21 Navigation objects may be disabled by including an indication within the navigation
22 objects that they should not be part of the filtering process. The act of retrieving navigation
23 objects, as shown in blocks 422 and 522 of Figures 4A and 5A, may ignore navigation
24 objects that have been marked as disabled so they are not retrieved. Alternatively, a separate

1 act could be performed to eliminate disabled navigation objects from being used in filtering
2 multimedia content.

3 The acts of receiving a password (610), displaying or sending a representation of the
4 navigation objects (620), receiving a response identifying navigation objects to
5 disable (630), and disabling navigation objects (640), have been enclosed in a dashed line to
6 indicate that they are examples of acts that are included within a step for deactivating
7 navigation objects (660). As with the exemplary methods previously described, deactivating
navigation objects may be practiced in either a consumer system or a server system.

9 Figure 7 illustrates an exemplary method for assisting a consumer system in
10 automatically identifying and filtering portions of multimedia content. A step for providing
11 an object store (710) includes the acts of creating navigation objects (712), creating an
12 object store (714), and placing the navigation objects in the object store 716. A step for
13 providing navigation objects (720) follows. The step for providing navigation objects (720)
14 includes the acts of receiving a content identifier (722), such as a title, and receiving a
15 request for the corresponding navigation objects (726).

16 In the step for charging (730) for access to the navigation objects, block 732
17 identifies the act of determining if a user has an established account. For example, if a user
18 is a current subscriber then no charge occurs. Alternatively, the charge could be taken from a
19 prepaid account without prompting the user (not shown). If no established account exists,
20 the user is prompted for the fee, such as entering a credit card number or some other form of
21 electronic currency, at block 734 and the fee is received at block 736. A step for providing
22 navigation objects (740) follows that includes the act of retrieving the navigation
23 objects (742) and sending the navigation objects to the consumer system (744). The act of

24

1 downloading free navigation software that makes use of the navigation objects also may be
2 included an inducement for the fee-based service of accessing navigation objects.

3 The present invention may be embodied in other specific forms without departing
4 from its spirit or essential characteristics. The described embodiments are to be considered
5 in all respects only as illustrative and not restrictive. The scope of the invention is, therefore,
6 indicated by the appended claims rather than by the foregoing description. All changes
7 which come within the meaning and range of equivalency of the claims are to be embraced
8 within their scope.

9 What is claimed and desired to be secured by United States Letters Patent is:

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1 1. In a computerized system for enabling a consumer to digitally filter multimedia
2 content that is comprised of video content, audio content, or both, and wherein the
3 consumer's computer system includes a processor, a memory, a decoder, and an output
4 device for playing the multimedia content, a method for assisting the consumer to
5 automatically identify portions of the multimedia content that are to be filtered and to
6 thereafter automatically filter the identified portions, the method comprising the acts of:

7 creating an object store which can be loaded into a memory of the computer
8 system of the consumer, the object store including a plurality of navigation objects,
9 each of which defines a portion of the multimedia content that is to be filtered by
10 defining a start position and a stop position and a specific filtering action to be
11 performed on the portion of the multimedia content defined by the start and stop
12 positions for that portion;

13 decoding the multimedia content on the computer system of the consumer
14 and as the multimedia content is output from a decoder of the computer system,
15 continuously updating a position code;

16 as the multimedia content is decoding, continuously monitoring the position
17 code and comparing it with each navigation object to determine whether the position
18 corresponding to the position code is within one of the navigation objects;

19 when the position code is determined to be within a navigation object,
20 activating the filtering action assigned to the particular navigation object in order to
21 filter the multimedia content for that portion defined by the navigation object; and

22 transferring the multimedia content to an output device, whereby the
23 multimedia content is played at the output device excluding each portion thereof
24 which is filtered in accordance with the plurality of navigation objects.

1 2. A method as recited in claim 1 wherein the filtering action is either skipping or
2 reframing the portion of the multimedia content defined by the particular navigation object.

3
4 3. A method as recited in claim 2, wherein the filtering action is skipping the
5 portion of the multimedia content defined by the particular navigation object, the method
6 further comprising the acts of:

7 terminating the decoding of the multimedia content at the start position of the
8 particular navigation object;

9 advancing to the stop position of the particular navigation object; and
10 resuming the decoding of the multimedia content at the stop position of the
11 particular navigation object.

12
13 4. A method as recited in claim 1 wherein the multimedia content is comprised of
14 one or more channels of audio content and the filtering action assigned to the particular
15 navigation object is muting at least one channel of the audio content for the portion of the
16 audio content defined by the particular navigation object.

17
18 5. A method as recited in claim 1 wherein the decoder includes a vendor
19 independent interface and wherein interaction with the decoder occurs through the vendor
20 independent interface.

21
22 6. A method as recited in claim 1 wherein consumer's computer system comprises
23 one of (i) components of a personal computer, (ii) components of television system, and (iii)
24 components of an audio system.

1 7. A method as recited in claim 1 wherein a plurality of object stores are available,
2 the method further comprising the acts of:

3 retrieving the title of the multimedia content from the decoder; and
4 selecting the object store from the plurality of object stores based on the title
5 of the multimedia content retrieved from the decoder.

6
7 8. A method as recited in claim 1 wherein the consumer's computer system
8 includes a source of the multimedia content comprising one of a DVD, a CD, a random
9 access memory, a hard drive, a removable disk storage medium, and a tape storage medium.

10
11 9. A method as recited in claim 1 wherein the position codes are time codes.

12
13 10. A method as recited in claim 1 wherein the plurality of navigation objects are
14 based at least in part on the age appropriateness of the portions of the multimedia content
15 defined by the plurality of navigation objects, age appropriateness being determined
16 according to either industry or community standards.

17
18 11. A method as recited in claim 1 wherein the object store at least initially is located
19 at a remote system, and wherein the consumer's computer system and the remote system are
20 interconnected through a communication link, the method further comprising the act of
21 accessing the object store over the communication link.

1 12. A method as recited in claim 1 wherein navigation object includes a
2 configuration identifier, the method further comprising the acts of:

3 assigning a configuration identifier to the decoder;

4 comparing the configuration identifier of the particular navigation object with
5 the configuration identifier of the decoder to determine if the particular navigation
6 object applies to the decoder; and

7 determining that the particular navigation object applies to the decoder based
8 on the configuration identifier of the particular navigation object matching the
9 configuration identifier of the decoder.

10
11 13. A method as recited in claim 1 further comprising the acts of:

12 displaying a representation of the plurality of navigation objects, the
13 representation including a description of each of the plurality of navigation objects;

14 receiving a password to authorize disabling at least one of the plurality of
15 navigation objects;

16 receiving a response to the representation of the plurality of navigation
17 objects, the response identifying the at least one of the plurality of navigation objects
18 to be disabled; and

19 disabling the at least one of the plurality of navigation objects such that the
20 video action specified by the at least one of the plurality of navigation objects is
21 ignored.

1 14. In a computerized system for enabling a consumer to digitally filter audio
2 content, wherein the consumer's computer system includes a processor, a memory, a
3 decoder, and an output device for playing the audio content, a method for assisting the
4 consumer to automatically identify portions of the audio content that are to be filtered and to
5 thereafter automatically filter the identified portions, comprising the acts of:

6 creating an object store which can be loaded into a memory of the computer
7 system of the consumer, the object store including a plurality of navigation objects,
8 each of which defines a portion of the audio content that is to be filtered by defining
9 a start position and a stop position and a specific filtering action to be performed on
10 the portion of the audio content defined by the start and stop positions for that
11 portion;

12 decoding the audio content on the computer system of the consumer and as
13 the audio content is output from a decoder of the computer system, continuously
14 updating a position code;

15 as the audio content is decoding, continuously monitoring the position code
16 and comparing it with each navigation object to determine whether the position
17 corresponding to the position code is within one of the navigation objects;

18 when the position code is determined to be within a navigation object,
19 activating the filtering action assigned to the particular navigation object in order to
20 filter the audio content for that portion defined by the navigation object; and

21 transferring the multimedia content to an output device, whereby the
22 multimedia content is played at the output device excluding each portion thereof
23 which is filtered in accordance with the plurality of navigation objects.

1 15. A method as recited in claim 14 wherein the position codes are time codes.

2
3 16. A method as recited in claim 15 wherein the audio content is comprised of one or
4 more channels and the filtering action assigned to the particular navigation object is muting
5 at least one channel of the audio content for the portion of the audio content defined by the
6 particular navigation object.

7
8 17. A method as recited in claim 16 wherein the object store comprises navigation
9 objects corresponding to a variety of audio content, the method further comprising the acts
10 of:

11 retrieving the title of the audio content from the decoder; and

12 selecting the plurality of navigation objects from the object store based on the
13 title of the audio content retrieved from the decoder.

14
15 18. A method as recited in claim 17 wherein the decoder includes a vendor
16 independent interface and wherein interaction with the decoder occurs through the vendor
17 independent interface.

18
19 19. A method as recited in claim 18 wherein the consumer's computer system
20 includes a source of audio content comprising one of a DVD, a CD, a random access
21 memory, a hard drive, a removable disk storage medium, and a tape storage medium.

1 20. In a computerized system for enabling a consumer to digitally filter video
2 content, wherein the consumer's computer system includes a processor, a memory, a
3 decoder, and an output device for playing the video content, a method for assisting the
4 consumer to automatically identify portions of the video content that are to be filtered and to
5 thereafter automatically filter the identified portions, comprising the acts of:

6 creating an object store which can be loaded into a memory of the computer
7 system of the consumer, the object store including a plurality of navigation objects,
8 each of which defines a portion of the video content that is to be filtered by defining
9 a start position and a stop position and a specific filtering action to be performed on
10 the portion of the video content defined by the start and stop positions for that
11 portion;

12 decoding the video content on the computer system of the consumer and as
13 the video content is output from a decoder of the computer system, continuously
14 updating a position code;

15 as the video content is decoding, continuously monitoring the position code
16 and comparing it with each navigation object to determine whether the position
17 corresponding to the position code is within one of the navigation objects;

18 when the position code is determined to be within a navigation object,
19 activating the filtering action assigned to the particular navigation object in order to
20 filter the video content for that portion defined by the navigation object; and

21 transferring the multimedia content to an output device, whereby the
22 multimedia content is played at the output device excluding each portion thereof
23 which is filtered in accordance with the plurality of navigation objects.

24

- 1 21. A method as recited in claim 20 wherein the position codes are time codes.
- 2
- 3 22. A method as recited in claim 21 wherein the filtering action is either skipping or
- 4 reframing the portion of the video content defined by the particular navigation object.
- 5
- 6 23. A method as recited in claim 22, wherein the filtering action is skipping the
- 7 portion of the multimedia content defined by the particular navigation object, the method
- 8 further comprising the acts of:
- 9 terminating the decoding of the video content at the start position of the
- 10 particular navigation object;
- 11 advancing to the stop position of the particular navigation object; and
- 12 resuming the decoding of the video content at the stop position of the
- 13 particular navigation object.
- 14
- 15 24. A method as recited in claim 23 wherein the video content includes audio content
- 16 that corresponds to the video content, the method further comprising the acts of:
- 17 terminating the decoding of the audio content at the start position of the
- 18 particular navigation object;
- 19 advancing to the stop position of the particular navigation object; and
- 20 resuming the decoding of the audio content at the stop position of the
- 21 particular navigation object.
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1 25. A method as recited in claim 20 wherein a plurality of object stores are available,
2 the method further comprising the acts of:

3 retrieving the title of the video content from the decoder; and
4 selecting the object store from the plurality of object stores based on the title
5 of the video content retrieved from the decoder.

6

7 26. A method as recited in claim 20 wherein the decoder includes a vendor
8 independent interface and wherein interaction with the decoder occurs through the vendor
9 independent interface.

10

11 27. A method as recited in claim 26 wherein the consumer's computer system
12 includes a source of video content comprising one of a DVD, a CD, a random access
13 memory, a hard drive, a removable disk storage medium, and a tape storage medium.

14

15 28. A method as recited in claim 27 wherein consumer's computer system comprises
16 one of (i) components of a personal computer, (ii) components of a television system, and
17 (iii) components of an audio system.

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1 29. A method as recited in claim 28 further comprising the acts of:

2 displaying a representation of the plurality of navigation objects, the
3 representation including a description of each of the plurality of navigation objects;

4 receiving a password to authorize disabling at least one of the plurality of
5 navigation objects;

6 receiving a response to the representation of the plurality of navigation
7 objects, the response identifying the at least one of the plurality of navigation objects
8 to be disabled; and

9 disabling the at least one of the plurality of navigation objects such that the
10 video action specified by the at least one of the plurality of navigation objects is
11 ignored.

1 30. In a computerized system for enabling a consumer to digitally filter multimedia
2 content that is comprised of video content, audio content, or both, and wherein the
3 consumer's computer system includes a processor, a memory, a decoder, and an output
4 device for playing the multimedia content, a method for assisting the consumer to
5 automatically identify portions of the multimedia content that are to be filtered and to
6 thereafter automatically filter the identified portions, the method comprising steps for:

7 providing an object store which can be loaded into a memory of the computer
8 system of the consumer, the object store including a plurality of navigation objects,
9 each of which defines a portion of the multimedia content that is to be filtered;

10 using a decoder of the consumer's computer system to determine when the
11 multimedia content decoded by the decoder is within the portions of the multimedia
12 content defined by the plurality of navigation objects;

13 when multimedia content decoded by the decoder is determined to be within
14 the portion of the multimedia content defined by a particular navigation object,
15 filtering the multimedia content; and

16 causing the multimedia content to be played at an output device, whereby the
17 multimedia content played at the output device excludes each portion thereof which
18 is filtered in accordance with the plurality of navigation objects.

19
20 31. A method as recited in claim 30 wherein consumer's computer system comprises
21 one of (i) components of a personal computer, (ii) components of a television system, and
22 (iii) components of an audio system.

1 32. A method as recited in claim 30 wherein each of the plurality of navigation
2 objects includes (i) a start position and a stop position for defining the portion of the
3 multimedia content that is to be filtered, and (ii) a specific filtering action to be performed
4 on the portion of the multimedia content defined by the start and stop positions for that
5 portion, and wherein the step for using the decoder comprises the acts of:

6 decoding multimedia content; and
7 continuously updating a position code as multimedia content is decoded by
8 the decoder.

9
10 33. A method as recited in claim 32 wherein the multimedia content includes video
11 content and wherein the step for filtering the multimedia content comprises the acts of:

12 comparing the position code with each navigation object;
13 determining the position corresponding to the position code is within a
14 particular navigation object;
15 terminating the decoding of the video content at the start position of the
16 particular navigation object;
17 advancing to the stop position of the particular navigation object; and
18 resuming the decoding of the video content at the stop position of the
19 particular navigation object.

1 34. A method as recited in claim 32 wherein the multimedia content includes one or
2 more channels of audio content and wherein the step for filtering the multimedia content
3 comprises the acts of:

4 comparing the position code with each navigation object;
5 determining the position corresponding to the position code is within a
6 particular navigation object;
7 muting at least one channel of the audio content for the portion of the audio
8 content defined by the particular navigation object.

9
10 35. A method as recited in claim 32 wherein the position codes are time codes.

11
12 36. A method as recited in claim 30 further comprising a step for deactivating at least
13 one of the plurality of navigation objects.

14
15 37. A method as recited in claim 30 wherein the decoder includes a vendor
16 independent interface and wherein interaction with the decoder occurs through the vendor
17 independent interface.

18
19 38. A method as recited in claim 30 wherein the consumer's computer system
20 includes a source of the multimedia content comprising one of a DVD, a CD, a random
21 access memory, a hard drive, a removable disk storage medium, and a tape storage medium.

1 39. A computerized system for enabling a consumer to digitally filter multimedia
2 content that is comprised of video content, audio content, or both, wherein the computerized
3 system assists the consumer in automatically identifying portions of the multimedia content
4 that are to be filtered and to thereafter automatically filter the identified portions, the
5 computerized system comprising:

6 a multimedia source;

7 a decoder that receives multimedia content from the multimedia source;

8 an output device that plays multimedia content received from the decoder;

9 an object store loaded at least in part into a memory of the computerized
10 system, the object store containing a plurality of navigation objects, each of which
11 defines a portion of the multimedia content that is to be filtered by defining a start
12 position, a stop position, and a specific filtering action to be performed on the
13 portion of the multimedia content defined by the start and stop positions for that
14 portion; and

15 processor means coupled to the decoder and the memory for:

16 using a decoder to determine when the multimedia content decoded
17 by the decoder is within the portions of the multimedia content defined by the
18 plurality of navigation objects;

19 when multimedia content decoded by the decoder is determined to be
20 within the portion of the multimedia content defined by a particular
21 navigation object, filtering the multimedia content; and

22 causing the multimedia content to be played at an output device,
23 whereby the multimedia content played at the output device excludes each

24

1 portion thereof which is filtered in accordance with the plurality of navigation
2 objects.

3

4 40. A system as recited in claim 39 wherein the decoder and the processor means are
5 located remotely from each other, the system further comprising:

6 a communication link between the decoder and the processor means; and
7 processor means for interacting with the decoder over the communication
8 link.

9

10 41. A system as recited in claim 40 wherein the processor means is located in a
11 remote control device.

12

13 42. A system as recited in claim 40 wherein the processor means is located in a
14 server system, the server system being capable of interacting with one or more decoders
15 over the communication link.

1 43. A computerized system for enabling a consumer to digitally filter multimedia
2 content that is comprised of video content, audio content, or both, wherein the computerized
3 system assists the consumer in automatically identifying portions of the multimedia content
4 that are to be filtered and to thereafter automatically filter the identified portions, the
5 computerized system comprising:

6 multimedia source means for providing video content;

7 decoder means for decoding multimedia content received from the
8 multimedia source;

9 output means for playing multimedia content received from the decoder
10 means;

11 multimedia navigation means for associating filtering actions with navigation
12 portions of the multimedia content, the navigation portions of the multimedia content
13 being defined by the multimedia navigation means; and

14 processor means coupled to the decoder and the memory for:

15 using a decoder to determine when the multimedia content decoded
16 by the decoder is within the portions of the multimedia content defined by the
17 plurality of navigation objects;

18 when multimedia content decoded by the decoder is determined to be
19 within the portion of the multimedia content defined by a particular
20 navigation object, filtering the multimedia content; and

21 causing the multimedia content to be played at an output device,
22 whereby the multimedia content played at the output device excludes each
23 portion thereof which is filtered in accordance with the plurality of navigation
24 objects.

1 44. A system as recited in claim 43 wherein the decoder means and the processor
2 means are located remotely from each other, the system further comprising:

3 communication means for exchanging data between the decoder and the
4 processor means; and

5 processor means for interacting with the decoder over the communication
6 means.

7
8 45. A system as recited in claim 44 wherein the processor means is located in a
9 remote control device.

10
11 46. A system as recited in claim 44 wherein the processor means is located in a
12 server means, the server means being capable of interacting with one or more decoder means
13 over the communication means.

1 47. In a computerized system for enabling a consumer to digitally filter multimedia
2 content that is comprised of video content, audio content, or both, and wherein the
3 consumer's computer system includes a processor, a memory, a decoder, and an output
4 device for playing the multimedia content, a computer program product for implementing a
5 method of assisting the consumer to automatically identify portions of the multimedia
6 content that are to be filtered and to thereafter automatically filter the identified portions,
7 comprising:

8 a computer readable medium for carrying machine-executable instructions
9 for implementing the method; and

10 wherein said method is comprised of machine-executable instructions for
11 performing the acts of:

12 creating an object store which can be loaded into a memory of the
13 computer system of the consumer, the object store including a plurality of
14 navigation objects, each of which defines a portion of the multimedia content
15 that is to be filtered by defining a start position and a stop position and a
16 specific filtering action to be performed on the portion of the multimedia
17 content defined by the start and stop positions for that portion;

18 decoding the multimedia content on the computer system of the
19 consumer and as the multimedia content is output from a decoder of the
20 computer system, continuously updating a position code;

21 as the multimedia content is decoding, continuously monitoring the
22 position code and comparing it with each navigation object to determine
23 whether the position corresponding to the position code is within one of the
24 navigation objects;

1 when the position code is determined to be within a navigation object,
2 activating the filtering action assigned to the particular navigation object in
3 order to filter the multimedia content for that portion defined by the
4 navigation object; and

5 transferring the multimedia content to an output device, whereby the
6 multimedia content is played at the output device excluding each portion
7 thereof which is filtered in accordance with the plurality of navigation
8 objects.

9
10 48. A computer program product as recited in claim 47 wherein the position codes
11 are time codes.

12
13 49. A computer program product as recited in claim 47 wherein the filtering action is
14 skipping the portion of the multimedia content defined by the particular navigation object,
15 the method comprised further of machine-executable instructions for performing the acts of:

16 terminating the decoding of the multimedia content at the start position of the
17 particular navigation object;

18 advancing to the stop position of the particular navigation object; and

19 resuming the decoding of the multimedia content at the stop position of the
20 particular navigation object.

1 50. A computer program product as recited in claim 47 wherein the multimedia
2 content is comprised of one or more channels of audio content and the filtering action
3 assigned to the particular navigation object is muting, the method comprised further of
4 machine-executable instructions for performing the act of muting at least one channel of the
5 audio content for the portion of the audio content defined by the particular navigation object.

6
7 51. A computer program product as recited in claim 47 wherein the decoder includes
8 a vendor independent software interface and wherein the method is comprised further of
9 machine-executable instructions for performing the act of interacting with the decoder
10 through the vendor independent software interface.

11
12 52. A computer program product as recited in claim 47 wherein the method is
13 comprised further of machine-executable instructions for performing the act of:

14 displaying a representation of the plurality of navigation objects, the
15 representation including a description of each of the plurality of navigation objects;
16 receiving a password to authorize disabling at least one of the plurality of
17 navigation objects;

18 receiving a response to the representation of the plurality of navigation
19 objects, the response identifying the at least one of the plurality of navigation objects
20 to be disabled; and

21 disabling the at least one of the plurality of navigation objects such that the
22 video action specified by the at least one of the plurality of navigation objects is
23 ignored.

1 53. A computer program product as recited in claim 47 wherein the method is
2 comprised further of machine-executable instructions for performing the act of:

3 retrieving the title of the multimedia content from the decoder; and

4 selecting the plurality of navigation objects based on the title of the
5 multimedia content retrieved from the decoder.

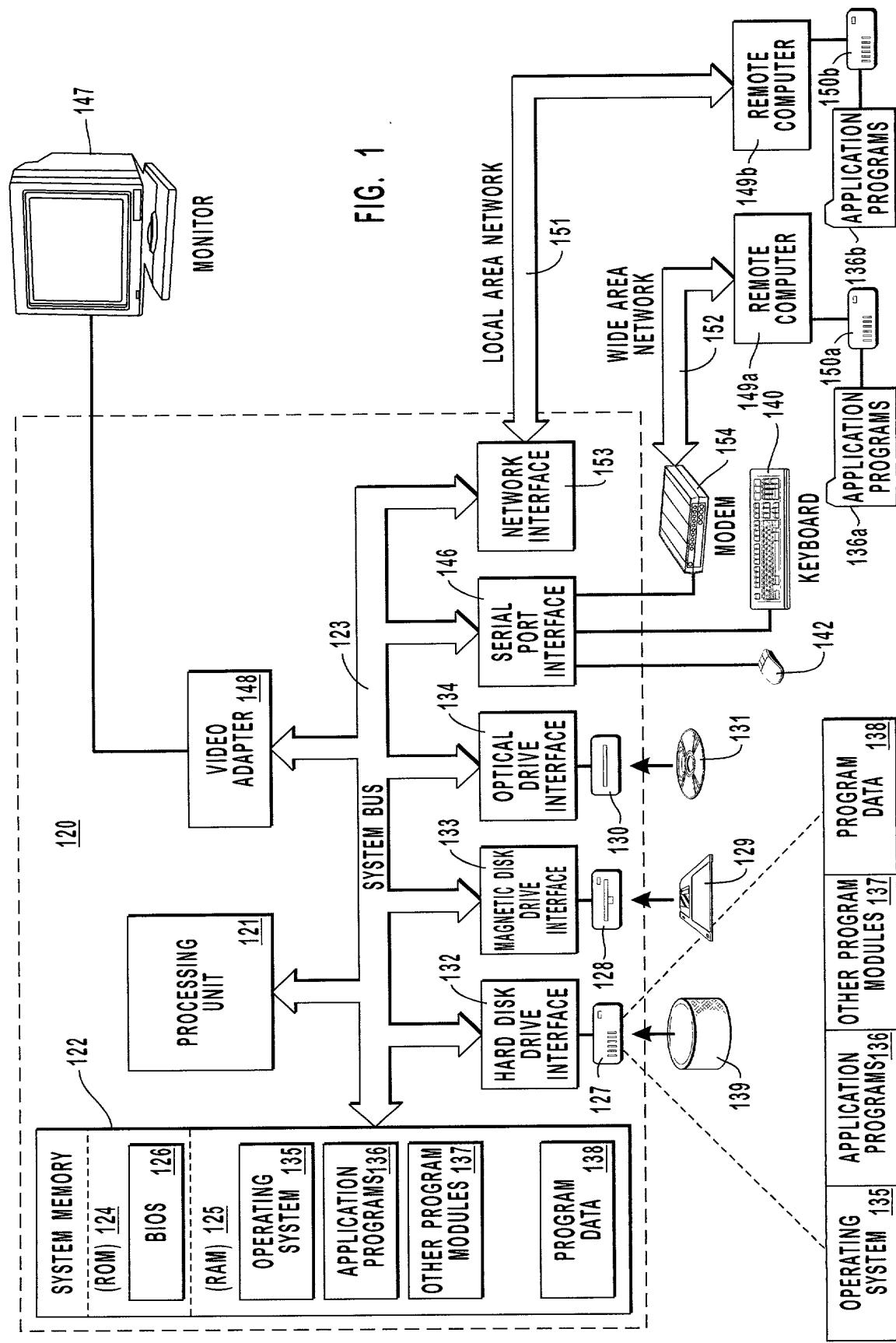
6

7 54. A computer program product as recited in claim 47 wherein the object store at
8 least initially is located at a remote system, and wherein the consumer's computer system
9 and the remote system are interconnected through a communication link, the method
10 comprised further of machine-executable instructions for performing act of accessing the
11 object store over the communication link.

ABSTRACT OF THE DISCLOSURE

In accordance with the present invention, a filtering process is based on the output side of a multimedia decoder. A navigator monitors the current play position of the multimedia content and compares that position with navigation objects. Each navigation object defines a start position, a stop position, and an filtering action to perform on the portion of the multimedia content that begins at the start position and ends at the stop position. When the current play position falls within the portion of multimedia content defined by a particular navigation object, the navigator activates the filtering action that was assigned to the navigation object. Filtering actions include skipping, muting, reframing, etc., the portion of multimedia content defined by a navigation object. A variety of systems may be used to implement the present invention, such as computer systems (consumer and server), television systems, and audio systems.

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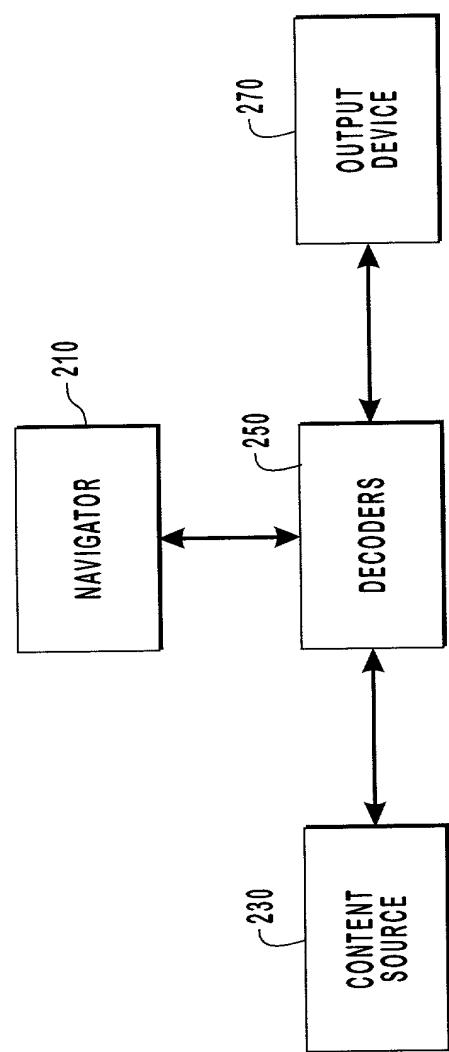
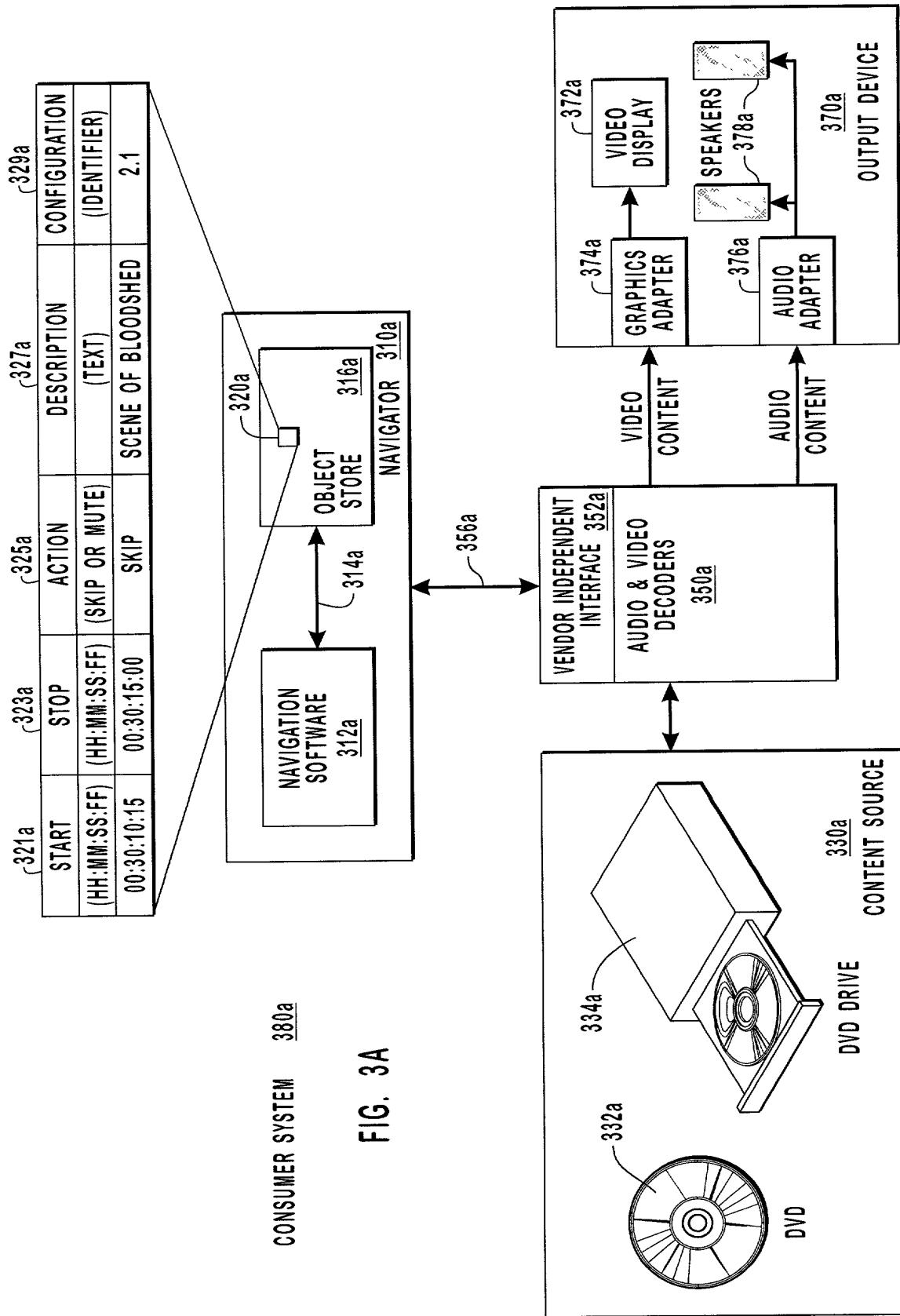
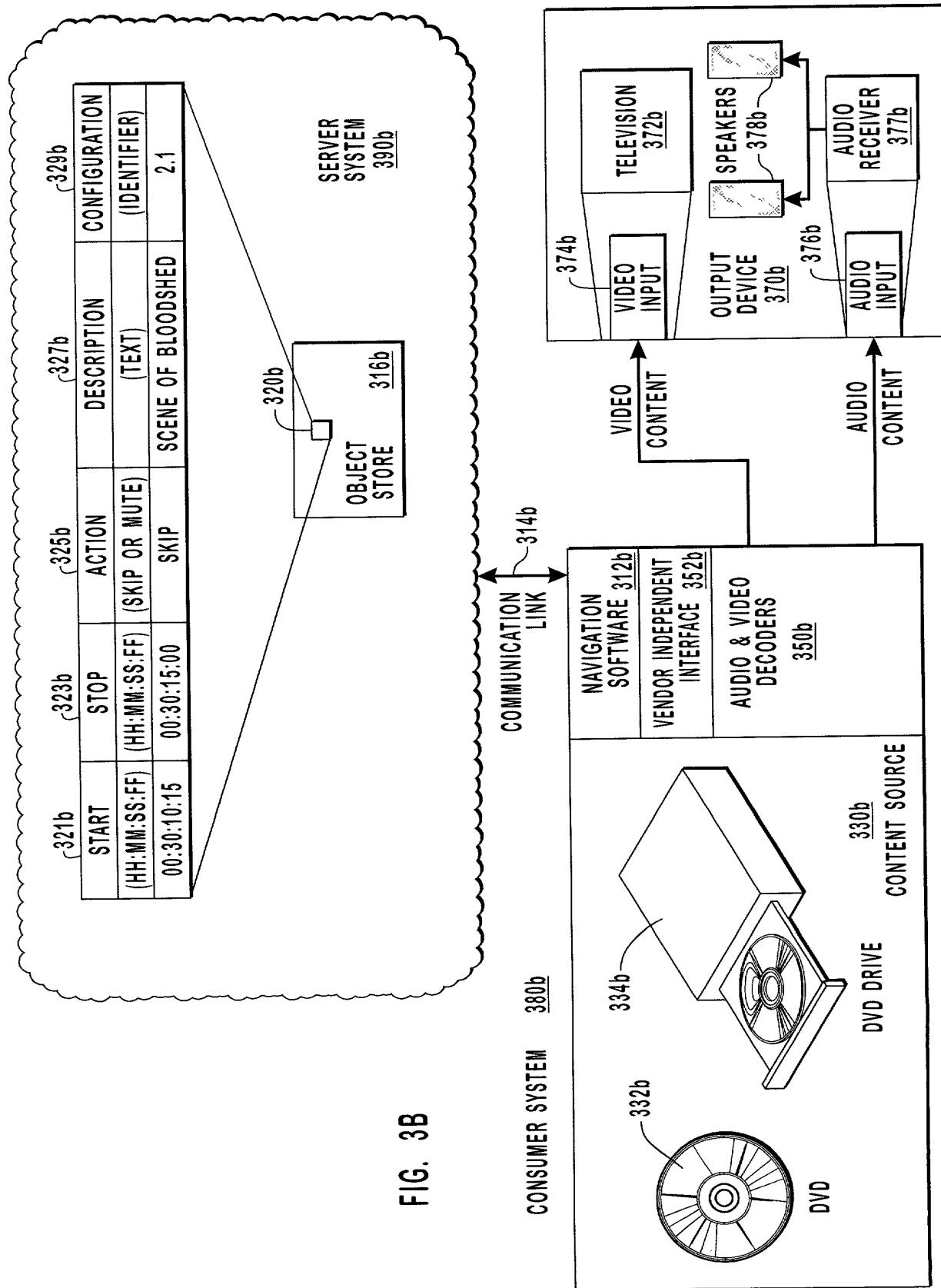


FIG. 2





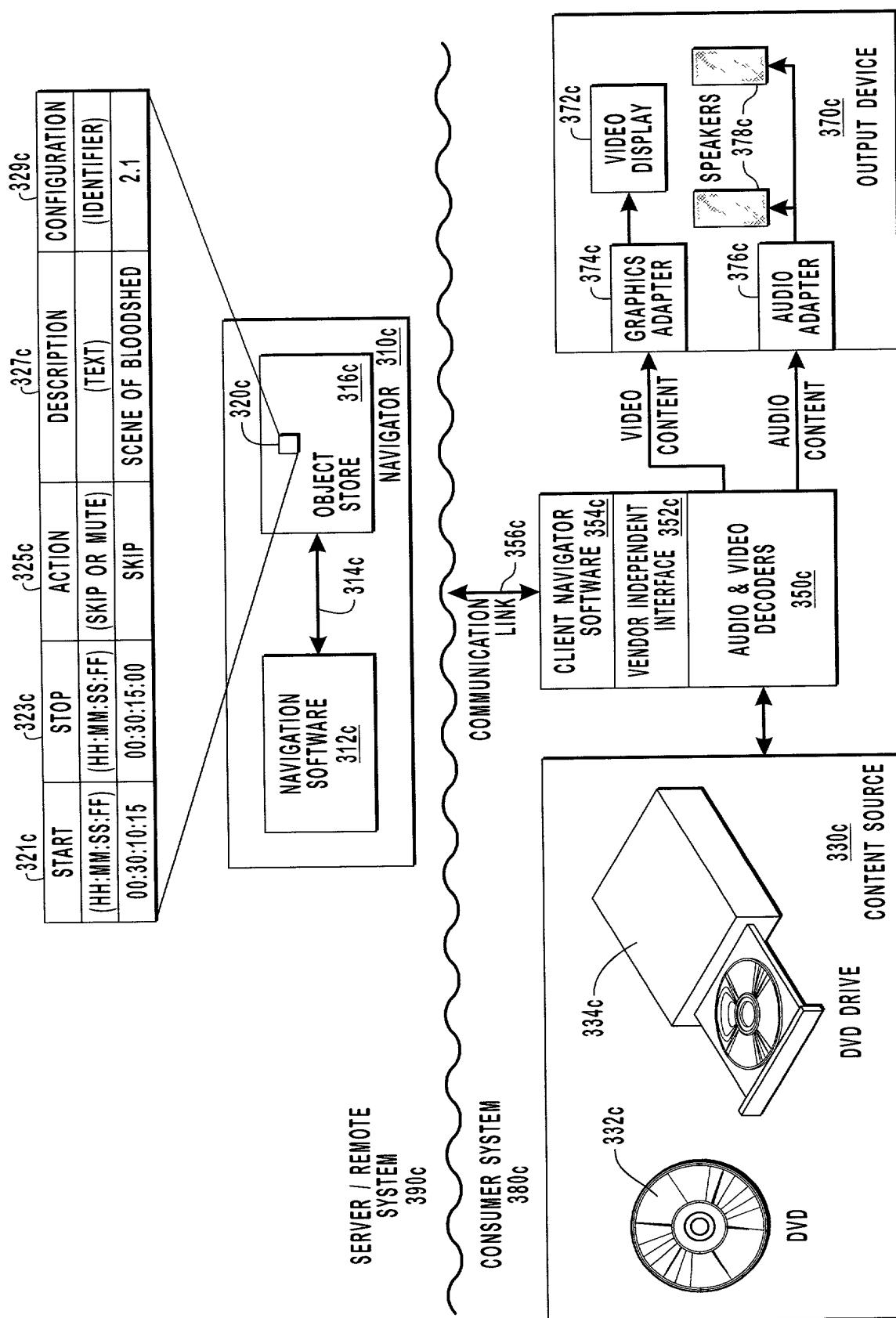


FIG. 3C

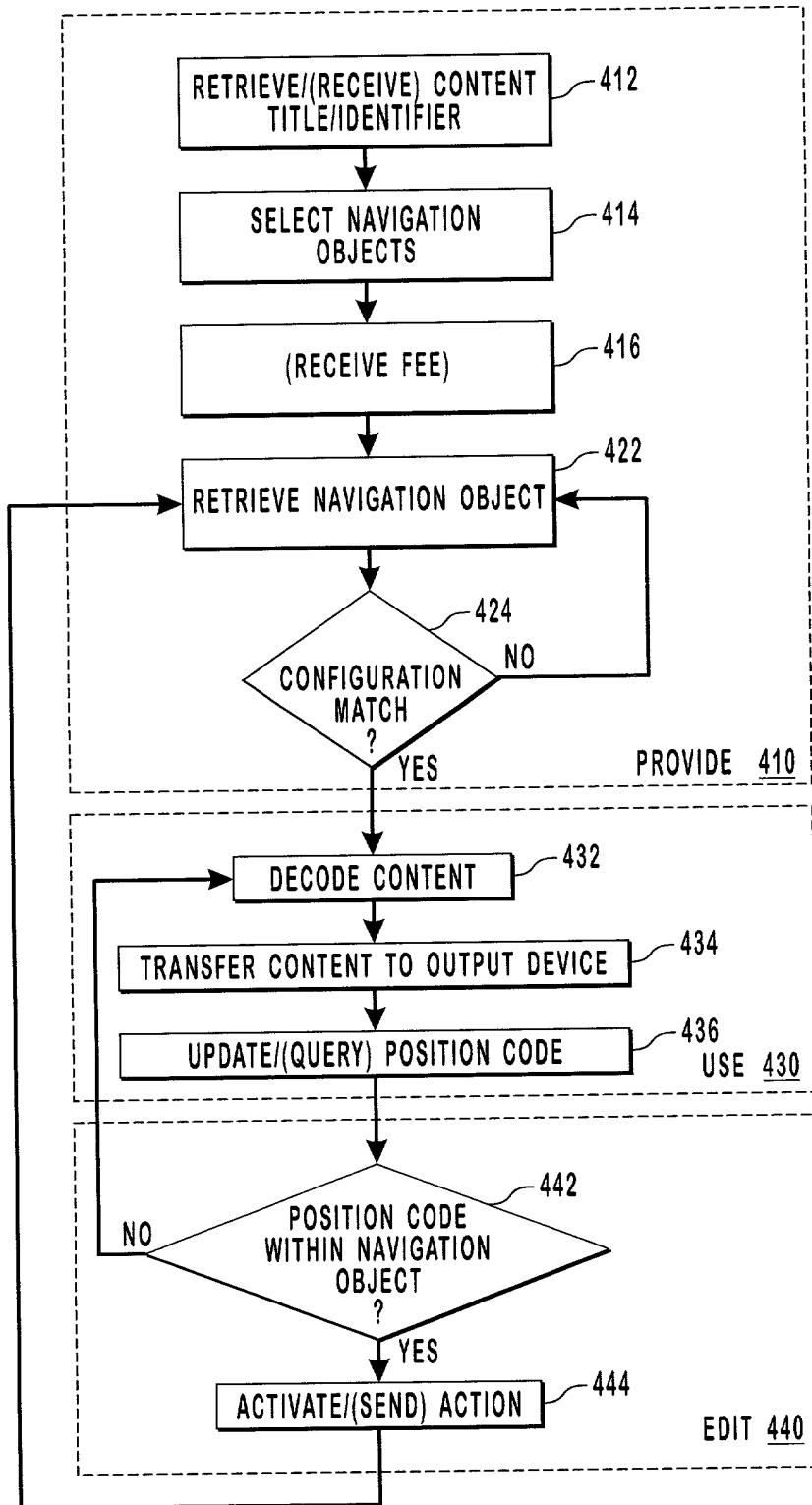


FIG. 4A

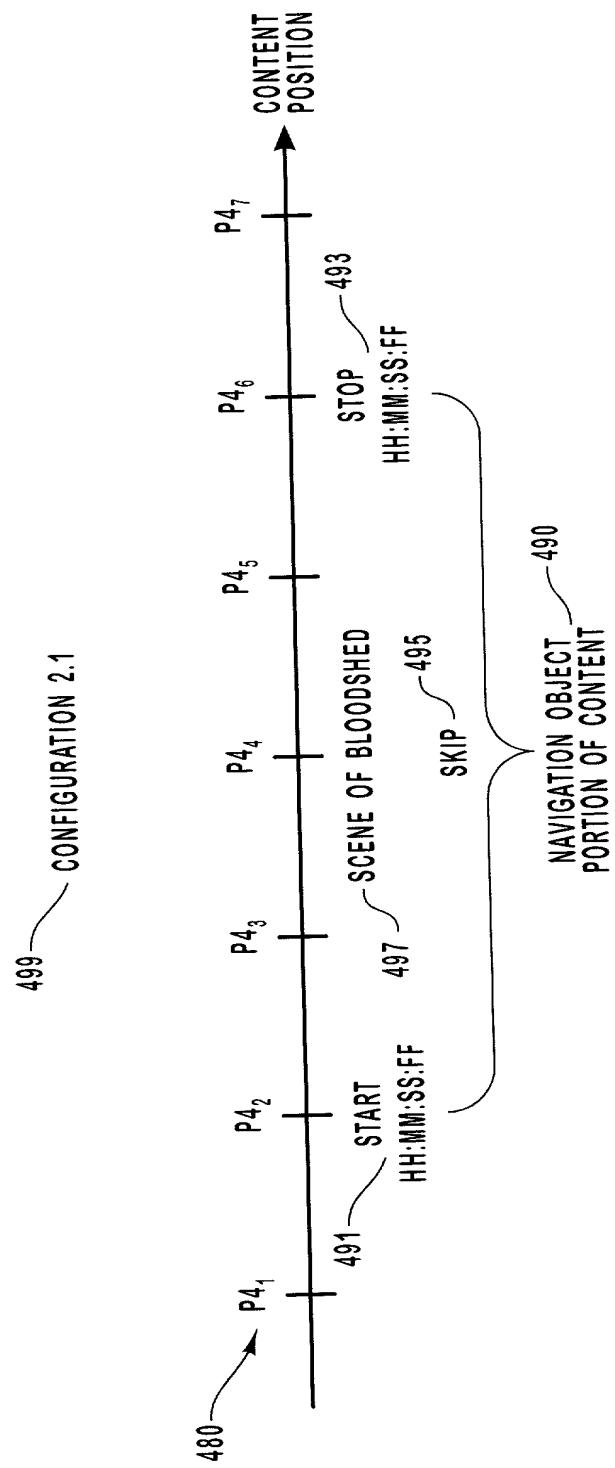


FIG. 4B

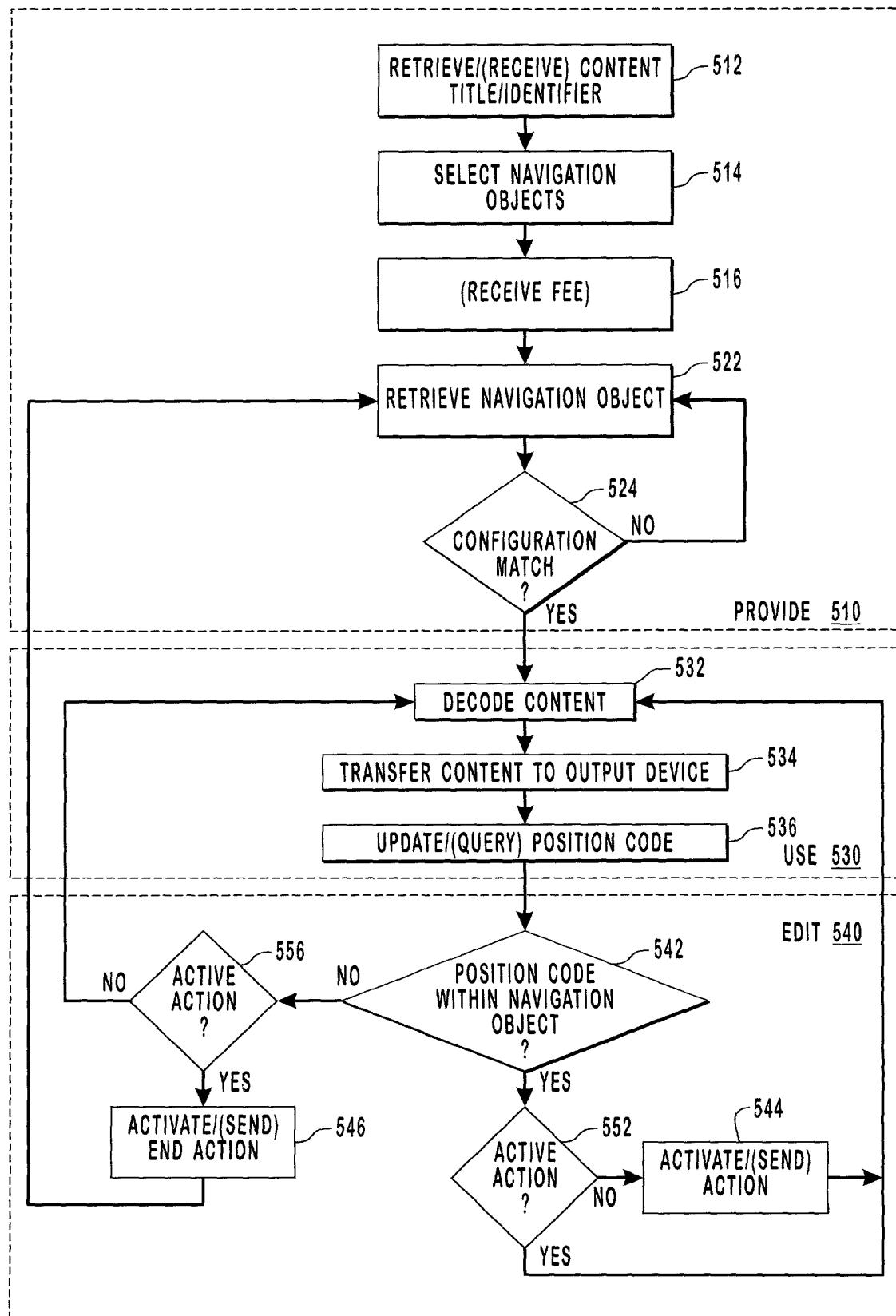


FIG. 5A

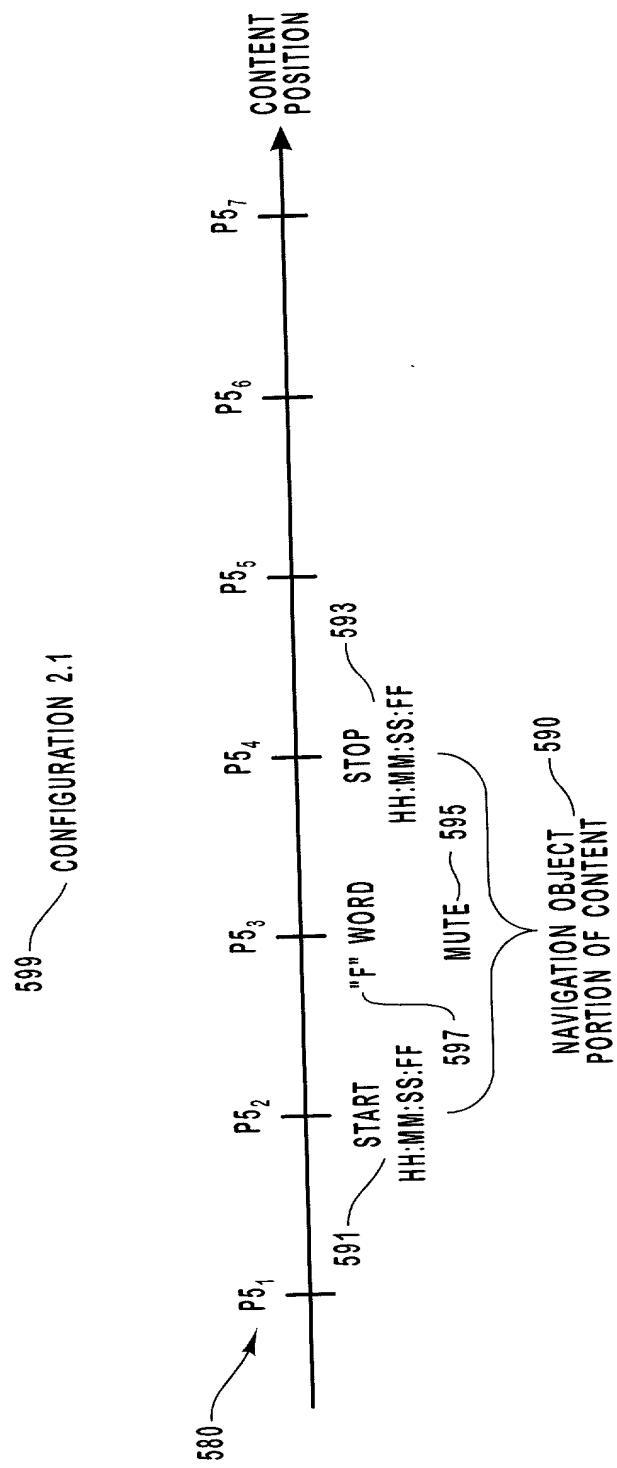


FIG. 5B

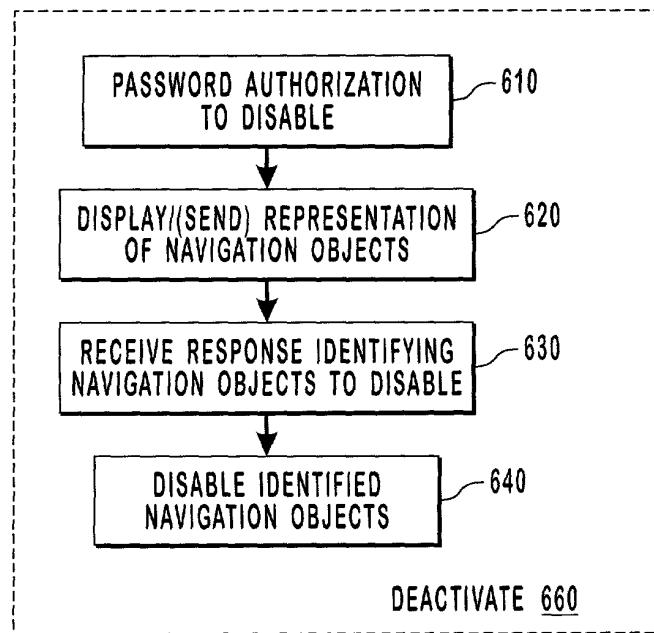


FIG. 6

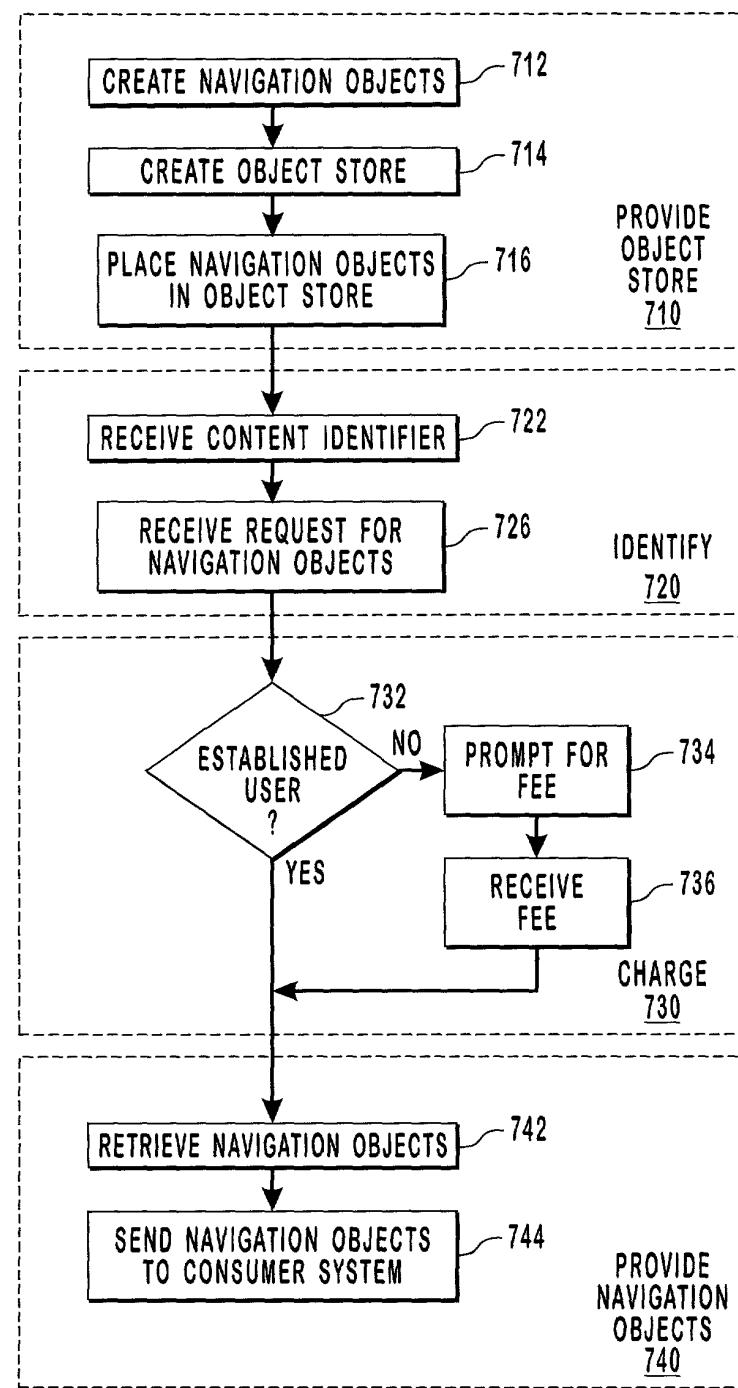


FIG. 7

DECLARATION, POWER OF ATTORNEY AND PETITION

I, Matthew Jarman, declare: that I am a citizen of the United States of America; that my residence and post office address is 3830 South 3100 East, Salt Lake City, UT 84109; that I verily believe I am the original, first, and sole inventor of the subject matter of the invention or discovery entitled MULTIMEDIA CONTENT NAVIGATION AND PLAYBACK, for which a patent is sought and which is described and claimed in the specification attached hereto; that I have reviewed and understand the contents of the above-identified specification, including the claims; and that I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Section 1.56(a) of Title 37 of the Code of Federal Regulations.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful, false statements may jeopardize the validity of the application or any patent issuing thereon.

I hereby appoint as my attorneys and/or patent agents all listed under Customer No. 022913, with full power to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. All correspondence and telephonic communications should be directed to:

RICK D. NYDEGGER
WORKMAN, NYDEGGER & SEELEY
1000 Eagle Gate Tower
60 East South Temple
Salt Lake City, Utah 84111

Wherefore, I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, declaration, power of attorney, and this petition.

Signed at Salt Lake City, Utah, this 23 day of October, 2000.

Inventor: Matthew Jarman
Matthew Jarman
3830 South 3100 East
Salt Lake City, UT 84109